THE AUTOMOBILE

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CHICAGO SHOW A MAGNIFICENT CREATION.

CHICAGO, Feb. 5.—New York's automobile show has been transplanted in the Coliseum and the First Regiment Armory of Chicago to fuller degree than most exhibitors may have realized. But while the Chicago visitor who was at New York admits this, he will insist that in Chicago, the exhibition has been housed with a show of good taste and artistic effect that excels the New York exhibitions. The two buildings stand back to back on the same alley and a hundred yards apart, a covered way out of the Coliseum annex leading to the alley, down one side of the alley and opposite the rear of the First Regiment show place, where the first break is made in the clean, clear gangway which makes the two shows one.

Not the least interesting place of the fifth annual show in Chicago is this boardway, nearly six feet wide, which unites the two buildings. It becomes at once an impromptu promenade along which double rows of visitors move at all hours under the long lines of electric lights, back and forth, a party frequently dropping into march step to the chanted air of some popular operatic bit and violating all rules of bridge maintenance in the measured beat of shoe soles.

And from either of these buildings at

COLISEUM BUILDING ON WABASH AVENUE, CHICAGO, WHERE AUTOMOBILE SHOW IS IN PROGRESS, SHOWING SHELTERED MAIN ENTRANCE.

which the visitor has entered the passageway is worth while, even without the novelty of a winter promenade in the warmth, light and dry.

The Coliseum building, fronting main transportation lines, is the chief entrance for visitors, just as it is the chief show place of the two. Its magnitude over the other building has allowed of a scheme of decoration which, while carried out as far as possible in the smaller place, cannot distinguish the effect as seen in the Coliseum. But on the other hand the quality of the exhibits in the smaller building holds an interest out of proportion to the great building in Wabash avenue.

Manager S. A. Miles for the Chicago exhibition has said that $30,000 was expended in preparing for the show, and when one considers the acres of white and gold muslin fabrics draped and twisted into the roof spaces—the miles of yellow silken banners depending above the lines of exhibit limits—the black and gold staff pillars and the green and gold cornice effects strung upon them for the length of the buildings, and out of these rising great yellow globes of light fourteen feet up—the scene at once is suggestive of costly stage effects hardly to have been expected of an automobile show.

No setting for the automobile has ever been attempted in Chicago in such rich simplicity of effect. Tons of staff have been molded and modeled merely for the lettering of exhibitors' names above the booths. Each letter of a name stands in relief in white from a background of black and gold, swinging independently of its fellows from the stuccoed green-and-gold beam overhead and the groupings set off on a drapery of yellow silk. Hung from the roof arches are groups of arc lights whose white rays are tinged to a soft yellow before they reach the floor and there in the striking exhibition of colors shown in the automobiles themselves and in the dress of women visitors who lend so largely to the attendance, the garden effects of the exhibition may be expected to attract thousands who will have not the slightest idea of inquiry into the merits of one automobile over another.

Over the automobile show in New York this Chicago show presents some features of attendance that are worthy of note. For instance, the small boy here is in numerous evidence. He comes in gangs at times, scuttling in and out of the crowds and the exhibits, tooting a horn here, whirling a wheel there, and at all times a collector of literature on the subject of machines. He is a boy, first, utterly unconscious of others than himself and worming his way through as if those about him were trees. He has the Western nervousness of his climate and a precocious knowledge and interest in machinery and decorative finish that persons of greater maturity and material interests in the automobile might emulate to the well-being of the industry.

His small sister and his matronly mother are not so numerous, but his big and pretty sisters, his older brothers with other brothers' sisters on their arms, his downtown business father and his cattle country uncle in the wolfskin and bearskin coat are here, and from the salesman's point of view they are well worth the attention of the sales department of agency and factory.

Noticeably the Western car calls for colors that are absent in the Atlantic coast states and the Western East. Some of these cars are vivid in their markings and it is significant that some of these at any hour are found with groups of brightly dressed women resting in the tonneaus. Picture hats and pretty gowns and wraps heaped into these cars might be a part of the color scheme at night were it not so plain that the whole grouping is to be taken as an expression of approval of colors in a vehicle.

There is every incentive for dress in the arrangement and furnishings of the show itself. The long lines of exhibit spaces are covered with a soft carpeting of dark green material, with a marginal strip of dark red. The passages between are of smooth flooring, waxed, with an air of cleanliness and order manifest everywhere. Chairs and desks and tables are everywhere inviting rest for those who would talk merit in machines and accessories.

A Chicago winter of exceptional openness and mildness may have contributed to the overwhelming percentages of open cars on exhibit. Certainly there are surprisingly few of the closed type shown in contrast. It has long been remarked of the horse vehicles in Chicago that the old-fashioned "top buggy" of this city is characteristic of Chicago alone of all the great cities. There are more of them here than in any other great city in the country and they stand at every crowded corner downtown. But in contrast to this the large number of open cars and the unmistakable popular interest in the type may be taken as another proof of an old fact, that out of hand "you never can tell."

Another interesting observation of the Chicago show is that there are more foreign cars exhibited than ever before and, at the same time, more interest than in recent years in the runabout types of machines in the booths. And while the small runabout attracts to it more earnest inquisitiveness as to cost, operation and maintenance, the costly foreign car holds its crowd of another selection and awakens inquiry and interest that are unmistakable.

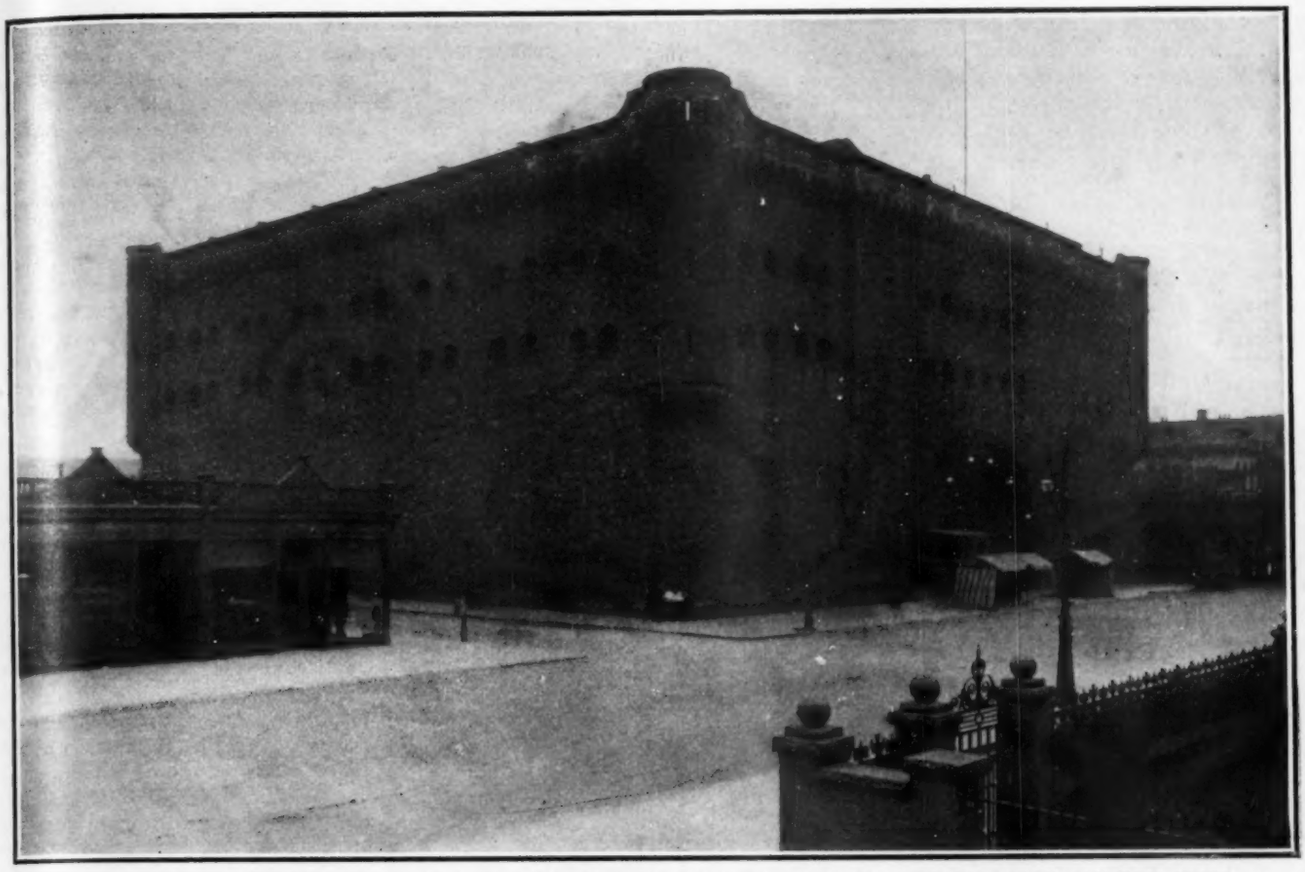
Between the crowds that jam around the runabout types and the groups which are asking as to the merits of the costly foreign and domestic manufactures, even the laymen may read the evolution of the automobile business. The person who has been driving a horse to an old-fashioned top buggy is considering the departure to an automobile of handy, runabout pattern, while the wealthy man, who has experimented to his satisfaction with the automobile as an experiment, is showing his purpose toward a costlier investment in a car of higher quality and development.

That this element of quality is entering every year more and more into the public mind is shown in the disposition of the exhibitor to set the open chassis of his machine side by side with the finished product of his factory, and, not content with this, he has now piled its working parts around it on tables or housed them in neat cabinets as a background for his exhibit. The individual interest of the visitor shown toward a rough forging as well as to the mirror finish of the completed part is to be taken as evidence of the public's education in the automobile.

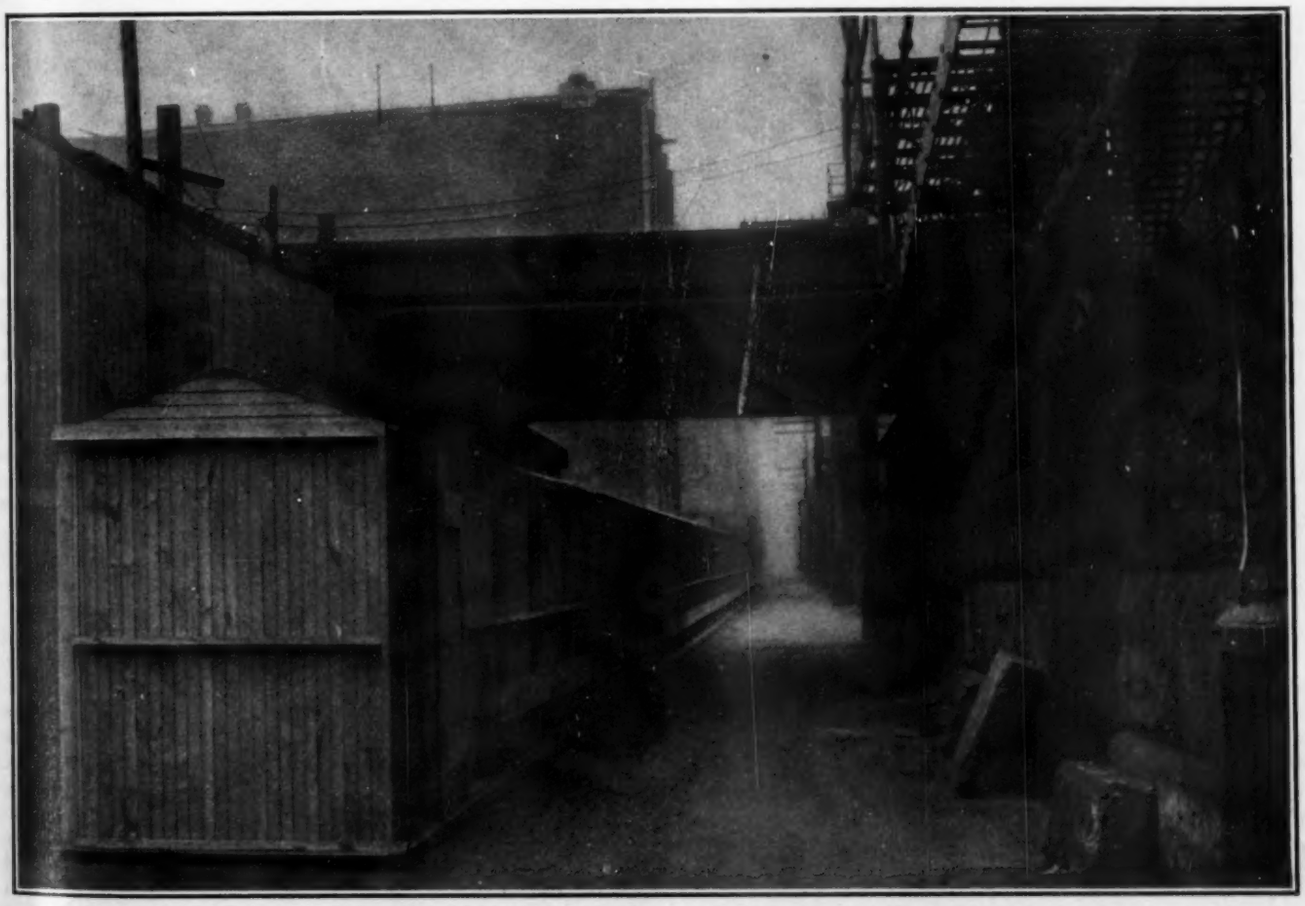
One of the chance features of the show that will not be overlooked by the interested visitor is the comparatively small section of the south annex of the Coliseum itself, which by some unstudied chance holds within itself the widest possible range of cars as to manner of propulsion. Steam, electricity and gasoline are represented here, with one of the great foreign cars attracting to it the studious interest of those whose possibilities of purse make it a serious study. Here in this little niche of a great show the novice, too, may go for his first practical insight into the applications of power to the automobile, and may leave with little else of fundamentals to learn.

This statement leads naturally to the element of salesmanship as it has been shown here. Never before were exhibitors called upon to get closer to the facts and to the answering of pertinent questions from those who know than are the attendants upon the booths at this fifth Chicago show. That this is appreciated already is shown in the bearing and attentiveness of those in charge of exhibits. There is a spirit of wideawake appreciation of the work of exhibiting on all sides. The manufacturer himself whose interests might well leave him to other activities, may be seen at his booth in the evening, dressed as for something other than business, bowing his recognition in a social way and yet as easily stooping over a gearbox or motor or sparking apparatus in a chassis, explaining as he would have employees do for him at factory or salesroom. The presence of such men has had a marked influence upon the exhibiting demonstrator in general, until in the showy evening crowds the element of slouchiness that is so easy of creeping in on the part of attendants has become hard to find, even for the purpose of showing a bad example.

Considered as a whole, the exhibition in Coliseum and Armory is such in environment as to do away with the old rough-and-ready methods of shop and store front salesroom. With excellent orchestras banked high up in the draperies of the roofs, with uniformed attendants on all sides, and the atmosphere of refinement everywhere through the promenading crowds, the impulse is for a homogeneity in all things. And it is there. From the galleries in the Coliseum especially, a glance down and up



FIRST REGIMENT ARMORY, MICHIGAN AVENUE AND SIXTEENTH STREET, USED FOR OVERFLOW FROM COLISEUM SHOW.



SIX-FOOT COVERED PASSAGE, 300 FEET LONG, CONNECTING REAR ENTRANCES OF THE COLISEUM AND ARMORY, ERECTED ESPECIALLY FOR THE OCCASION OF THE PRESENT AUTOMOBILE SHOW, FEBRUARY 3 TO 10.

conveys at once the artistic simplicity of the show. There is not a cranny in which a softened and yet sufficient light is not sent in search of convincing effects, or of *outre* grotesqueries. And this golden glow, whether of the winter sun in daylight through the glass roofs, or of the electric bulbs and arcs at night, makes plain the beauties of pavilions and exhibits.

In the long reaches of the Coliseum one sees the three long beams of stucco stretching away above the canopies and open tonneaus of the cars, fringed with yellow silk and set with yellow lights, each of these girders effects the dividing line between exhibits fronting right and left. All round the paneled walls in black and gold, the long rows of exhibits look out under the gallery widths from a fringing of silken drapery. And tier on tier above, the accessories of the automobile are ranged in almost countless diversity.

A birdseye map of mathematical design lies under the observer from above with every vestige of mathematical harshness obliterated in light and color. Music and flowers and ferns, with classic pavilion effects led to the harmonious whole. Even the New Yorker, looking down upon the presentation of this fifth annual Chicago show, may nod his head if he will to the frequent remark of the Chicagoan:

"Say, this lays it all over the New York show, doesn't it?"

Cars and Components in the Coliseum.

WHEN the facilities of available buildings are taken into consideration, the advantages of a double show for providing space for the proper exhibition of cars were plainly evident in the Coliseum, just as they had been previously in the Garden show in New York. Curiously enough an armory building in each instance provided floor space for the overflow, and, as at New York, the overflow has so many points of special interest all its own that it is difficult to treat of the Chicago show as composed of two separate exhibitions—one would not be complete without the other. To those who had carefully scrutinized the exhibits at the New York shows there was a disappointment in the display in the Coliseum; for after walking the several thousands of yards of aisles under the roofs of the two buildings there was something very familiar about the exhibits on view. It was more than ever before a new edition of the New York display, with a different binding and dress, but the same fund of information. To be sure there were some novelties, or, more correctly, the appearance of some exhibitors who had not displayed in New York. The number was not large, nor, indeed, were such exhibits as conspicuous as those which had been displayed at previous shows.

This first impression had hardly been mentally recorded, however, before the sophisticated visitor recalled that the Chicago show was for residents of the middle West, and to those who had been waiting for this display at their own doorstep it was quite as novel and fully as interesting as the New York presentations. In the technical and trade press no doubt most of the knowing ones who crowded the Coliseum on the opening night already had read about the cars on view; but here was a chance to compare the written reports with the reality and to get the mental perspective and the physical stereoscopic effect that a good pair of eyes in front of a discriminating mind can enjoy.

Aside from the question of novelty, which is purely comparative, the Chicago show of 1906, considered apart from other shows of the year, is notable for the increase in the number of exhibits of foreign cars. Hitherto the foreign car has been a good deal of an exotic at the Chicago show—an orchid, as it were, that satisfied curiosity, perhaps, but which did not awaken any such interest as the domestic growths. With few exceptions the exhibits of foreign cars were to be found in the Armory, the Coliseum being devoted almost entirely to American machines.

Another and rather unexpected feature in the Coliseum is the prevalence of open cars, though in most instances provision is made for protection against dust and rain by folding tops of the Cape cart or victoria type. The inclosed car is not slighted, and permanently inclosed car bodies are on view in considerable numbers, especially on machines that might be termed "town cars."

In point of ensemble the Chicago show, especially in the Coliseum, takes high rank. The scheme of decoration and the general air of almost scrupulous cleanliness and of "a place for everything and everything in its place" is notably artistic and harmonious. General Manager Samuel A. Miles has indeed given the Chicago public a delightful surprise and has set a new standard for exhibitions in the west.

The general arrangement of floor space of previous shows has been adhered to with aisles running the length of the building and crossing the hall at the center and at the ends, giving the stands a general rectangular form. The alcove spaces under the galleries and between the lower ends of the great roof arches, formerly bare and unattractive, are made very inviting by paneling of weathered wood and tinted burlap. As previously touched upon, the addition of the Armory floor area has made it possible to give exhibitors large spaces for the display of complete cars, and the stands are so disposed that there is a good deal of room for the visitor to move about in when making examinations.

In the Coliseum proper the largest spaces are occupied by the Pope interests, the Electric Vehicle Company, Thos. B. Jeffery & Company and the Olds and Knox exhibits. Of scarcely smaller size are the stands of the Woods Motor Vehicle Company, Locomobile, Packard, Peerless, National, Thomas, Franklin, Pierce, White, Orient, Royal, Cadillac, Winton, Stevens-Duryea, Mitchell, Premier and several others equally well known. Licensed and independent makers are side by side, and a feature of the display is the keeping together of all the products of one plant, whether electric or gasoline, for pleasure or for commercial use. To some makers this gives an opportunity for a more imposing display than was possible in New York, where the different types of cars were in general kept separate. A notable example of this is at the Knox stand, where the big new four-cylinder touring car shares space with the familiar motor under the body cars and with several machines for purely business uses.

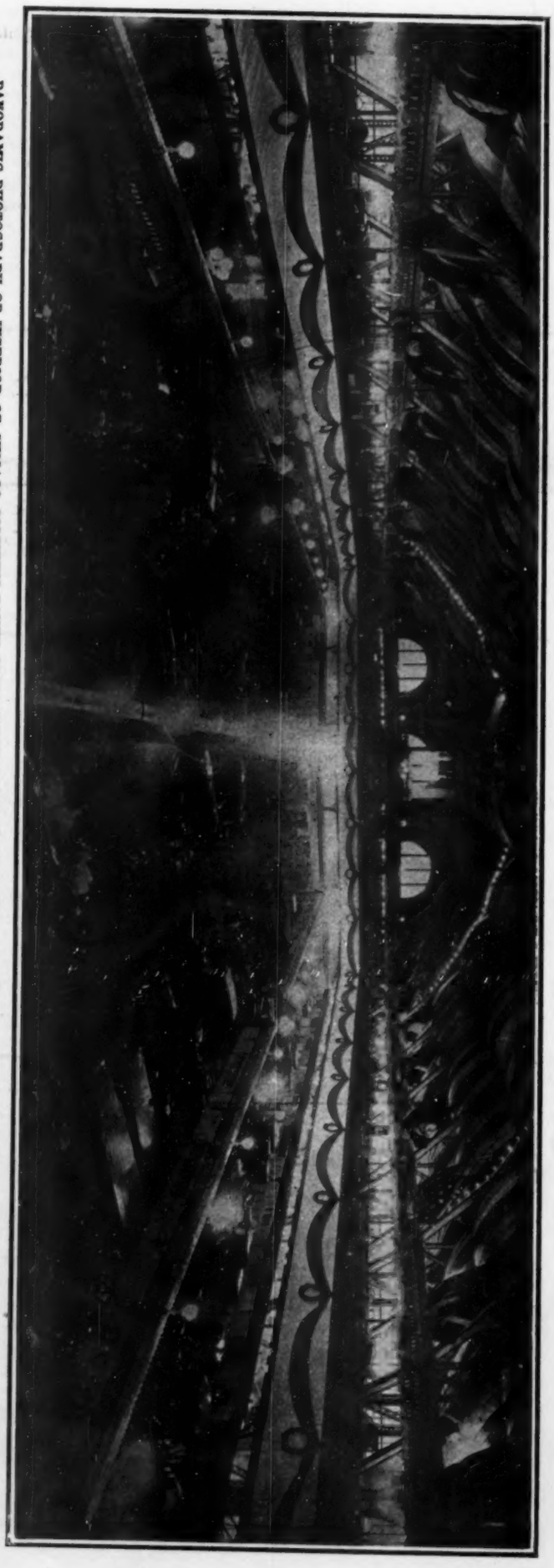
The largest display by a local concern is that made by the Woods Motor Vehicle Company, which shows a number of electric vehicles of the carriage type and two examples of its gasoline touring car, one a limousine and the other a side-entrance touring car with victoria top, both fitted with four-cylinder vertical motors of 45 horsepower. One of the electric vehicles—a victoria—is shown in natural wood finish of light color! the car driven by side chains. Another car of quite different type, but finished also in natural wood, is the Orient buckboard which, in its improved form, and sold at a low price, is always a center of attraction and interest. Crowds also surround the Ford runabout, just as they did at the Armory in New York. With bonnet removed and buggy top in rainy-weather position it shows a curious combination of the very modern and the old familiar.

The Northern, both in chassis and complete car, draws a crowd at the other end of the hall and its many original features keep the salesmen quite as busy making explanations as at the Garden show earlier in the year.

At the Locomobile stand the big Vanderbilt cup racer, piloted to a place by Joseph Tracy, shared the interest of a great throng with the various chassis and complete cars on view. Near by is the beautifully polished Packard chassis, which is expected at all shows and is a landmark here. The Packard runabout at this stand is a notable exhibit. In this car, on account of the comparative shortness of the body, —seating three— the designer has had a free hand in the relative location of parts and the engine is set well back of the front end of the frame in the most approved Continental fashion. The long, raking, diagonal, front mudguards connected with the frame by inside leather extensions help the general smart, "racy" appearance of the car, making altogether an extremely up-to-date combination.

To Chicago visitors the Olds line is an

GENERAL VIEW OF INTERIOR OF FIRST REGIMENT ARMORY, WHICH FORMS AN ANNEX OF THE COLISEUM—PARTS AND SUNDRIES EXHIBITS IN BALCONIES.



PANORAMIC PHOTOGRAPH OF INTERIOR OF CHICAGO COLISEUM, TAKEN FROM SOUTH BALCONY AND SHOWING FIFTH ANNUAL AUTOMOBILE SHOW IN PROGRESS THIS WEEK.

interesting one, for it is a novelty here. There is a comprehensive display of runabouts, two-cycle and four-cycle touring cars, an opera bus and an open carryall. The Holsman car is a peculiar and familiar Chicago product and is shown this year not only in the single seat type, but with surrey body also. This car, it will be recalled, has the general exterior lines of a buggy, including the wheels. The motor is of the double-opposed air-cooled type and the drive is by steel cable from sheaves on the countershaft to pulleys of large diameter concentric with the rear wheels and attached to the spokes.

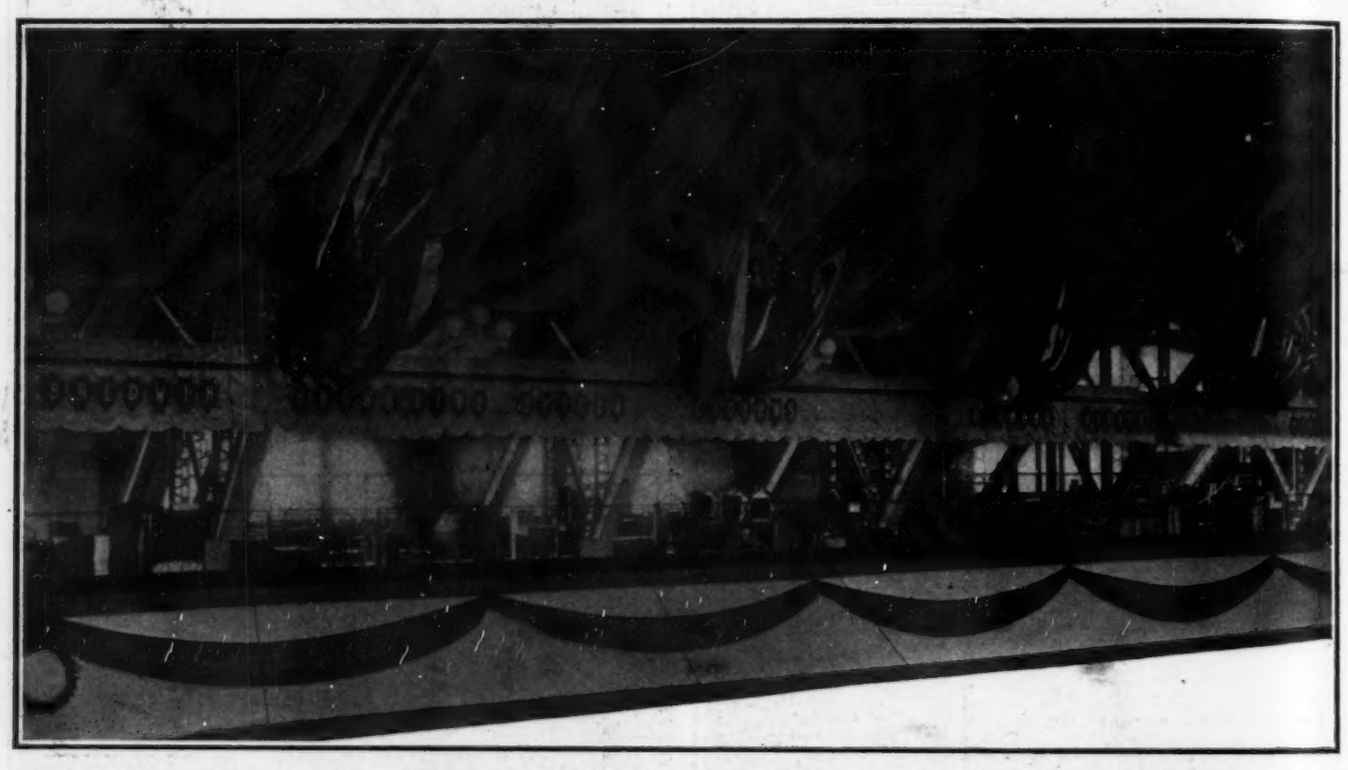
As never before, the builder of complete cars has taken the purchaser into his confidence in materials of construction, which are shown in the rough, partly machined, and fully finished state at many stands. At businesslike appearance. Of this type the Autocar touring car chassis, finished in dark blue and aluminum, and the Peerless in black and aluminum, are pretty pieces of work. In the 1906 Peerless a readily noticeable change is the adoption of hubs of equal size for front and rear wheels—a decided improvement in appearance upon the unequal sized hubs which hitherto have been characteristic of this machine.

At the Haynes stand two polished chassis are on view, each without radiator. In this car the engine is set well back from the front, the length of the frame making this possible, and this feature is accentuated by the absence of a radiator, which would be about in line with the front axle. The frame is tied at the front by a cross bar, that certainly safeguards the radiator in case of a head-on bump.

cessories and fittings is seen in great diversity, and, taking the cue from the general artistic scheme of decoration of the hall, the exhibitors have arranged their wares with unusual care. The result is an attractiveness that is sure to meet with a public response before the show is over.

Coliseum Annex.

In the light of a rather extensive experience in visiting automobile shows, it is difficult to recall anywhere a more comprehensive display of interesting things than are contained in the main floor and second story of the annex to the Coliseum. On the main floor the exhibit is in effect one with the Coliseum proper, for the main floor openings in the dividing wall are large and the visitor passes from one place



SECTION OF BALCONY IN COLISEUM, SHOWING EXHIBITS OF PARTS AND SUNDRIES AND ELABORATE DECORATIONS OF RAIL AND ROOF.

the Thomas exhibit a great wood panel is covered with components, chiefly drop forgings.

Six-cylinder cars are likely to be as much discussed here as in New York. The Stevens-Duryea exhibit includes a six-cylinder chassis and also a complete car, the latter with hubs of peculiar shape and of great size, recalling the famous "barrel hubs" of the Whipple Packard. To those who pride themselves on being able to pick out any car on the street, these hubs will be a valuable memory jog.

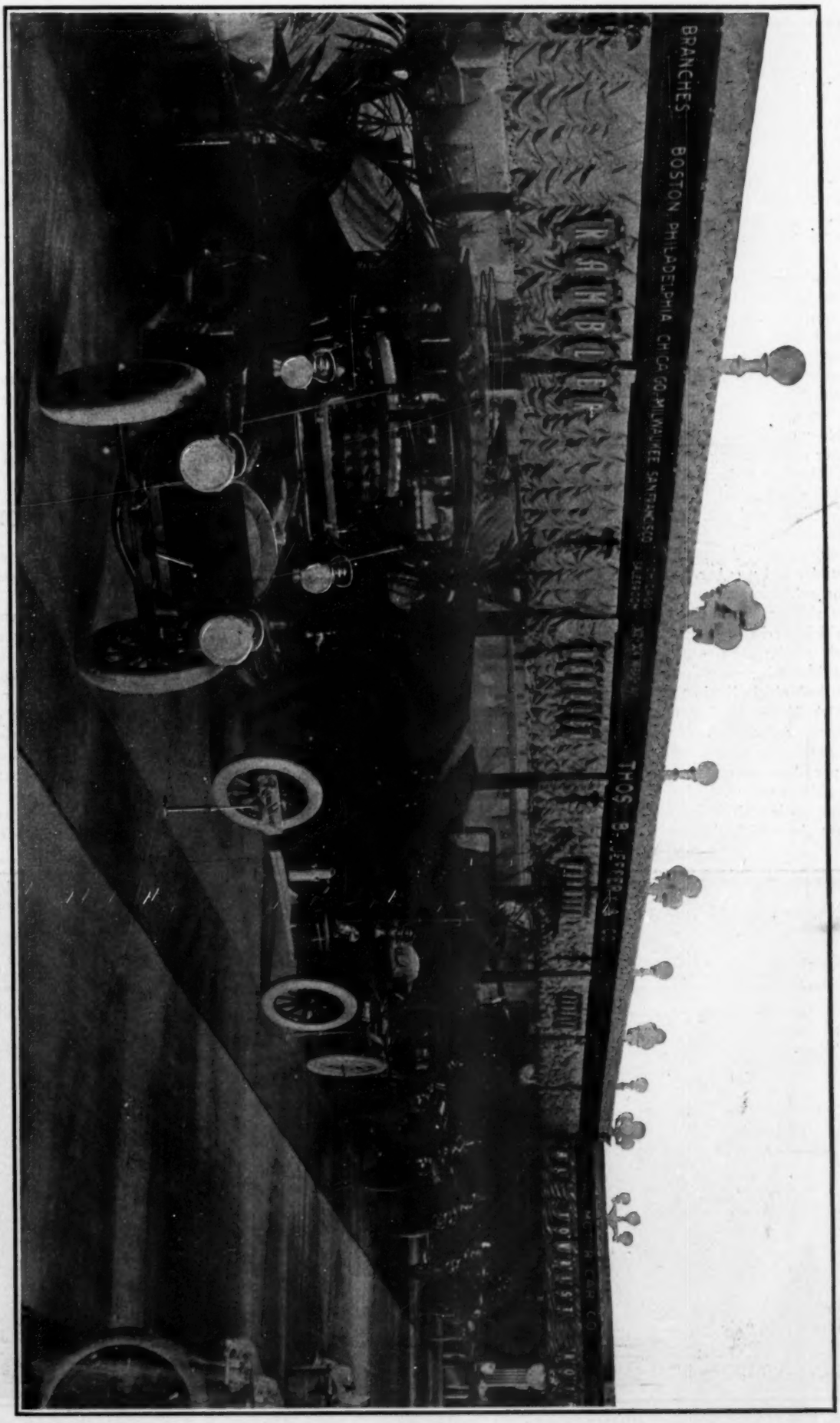
Following the now established show custom a great number of builders of cars exhibit complete chassis. Some of these are in nearly, if not altogether, the ordinary shop finish, and though not quite as interesting to the uninitiated as the show-finished chassis, they have an extremely practical,

So thoroughly is East and West mingled at this show that a visitor who has lost his sense of geographical location could hardly tell where it was being held from an inspection of the exhibits of cars. There is just a possibility that he might make a correct guess after a digestion, or rather indigestion, of the color schemes. These are so peculiar—original, perhaps—that if persisted in would cause the term of reproach "Get a horse" to fall into disuse, for certainly no spirited beast accustomed to the decorous color treatment of carriages would willingly consent to draw such a vehicle without blinders. Indeed, some of these "artistic creations" produce in the unaccustomed visitor about the same sensation as eating an unripe persimmon.

In the gallery surrounding the main floor of the Coliseum the familiar display of ac-

to the other without realizing it. Taken apart from the main hall the annex contains within its walls a very satisfactory show in miniature. Including both annex floors there are on view electric, steam and gasoline cars, for both pleasure and business uses, and the gasoline types range from typical American runabouts to the 1906 Mercedes touring car. And in gasoline motor equipment the choice can be made anywhere from the single horizontal water-cooled to the four-cylinder vertical air-cooled; or the compound may take one's fancy and a stop can be made to inspect a two-cycle motor exhibit among the component parts. There are still awaiting attention the friction drive transmission and an extensive exhibit of the motorcycle or "poor man's automobile."

Besides the complete cars, the whole



EXHIBITION STAND OF THOMAS B. JEFFERY & COMPANY IN THE COLISEUM, ON THE MAIN AISLE, SHOWING CHARACTERISTIC SCHEME OF DECORATION.

range of supplies for the user are shown and many for the builder also, so that whether gears or batteries, clothing or lamps are the objects of interest, there is plenty to occupy one's attention.

In the main floor two adjoining stands show very appropriately products of Chicago shops. The new "Chicago" steamer built by the Chicago Automobile Manufacturing Company, and the old-established Tincher gasoline touring car. In general exterior form the steamer appears familiar, though here the likeness to anything on the market practically ends. A large bonnet with condenser in front and water tank at the back in front of the dash, covers the coil pipe, semi-flash generator. This is piped to a four-cylinder, single-acting trunk engine set under the footboard with the cylinders inclined. Drive is by propeller shaft to rear live axle. Both a chassis and a complete side-entrance car are shown.

In the Tincher exhibit, alongside, two cars are displayed. One is a 70-horsepower open car with a spacious straight-line body modeled on Napier lines, and the other a 50-horsepower limousine. The former is of the now familiar vertical motor-in-front type of this builder and was borrowed from a customer for exhibition use. It brought back memories of Théry's 1904 Gordon Bennett winner which carried conspicuously on its sloping dash two large oilers.

On the main floor other extensive exhibits were made by the Vehicle Equipment Company, the Welch Motor Vehicle Company and the Jackson, Auburn, Austin, Buick and Pierce Engine companies among others.

On the upper floor several exhibits of cars are seen this year. One of the most interesting is not made with a view to creating sales of cars, the vehicle shown—though a product of the shop of the exhibitor—not being for sale. This interesting car is at the stand of the Chicago Pneumatic Tool Company and is one of a lot of fifty made by this concern for the use of its salesmen located in various parts of the country. The company has found that by supplying each agent with an automobile he is enabled to transact a great deal more business in a given time than he would be if he had to depend upon other methods of transit. Last season the company purchased several cars in the market, and from the experience gained with those machines the car on view was constructed. It is a 22-horsepower, four-cylinder, motor-in-front runabout with divided front seat, and beetle back made unusually deep to hold samples. It has a cone clutch, three-speed sliding-gear transmission and shaft drive. The wheelbase is 90 inches, tread, 56 inches, and wheels, 30 by 3 1-2 inches. It is apparently very strongly built to stand a lot of hard service.

On the opening day there were no exhibits in place at the stand of the American Motor Car Company, of Indianapolis, or the Harrison Wagon Company, of Grand Rapids. A creditable exhibit of complete cars is made on this floor by the Dorris Motor Car Company, and there is an interesting assemblage of electric carriages made by the Columbus Buggy Company. The Aerocar shows its new air-cooled touring car. Chassis with friction transmission are shown at the "Gearless" and "Windsor" exhibits. Another notable exhibit is the 35-40 German Mercedes 1906 model shown by the Mercedes Import Company, of New York, which has established a Chicago branch. Indian motorcycles are shown by the Hendee Manufacturing Company.

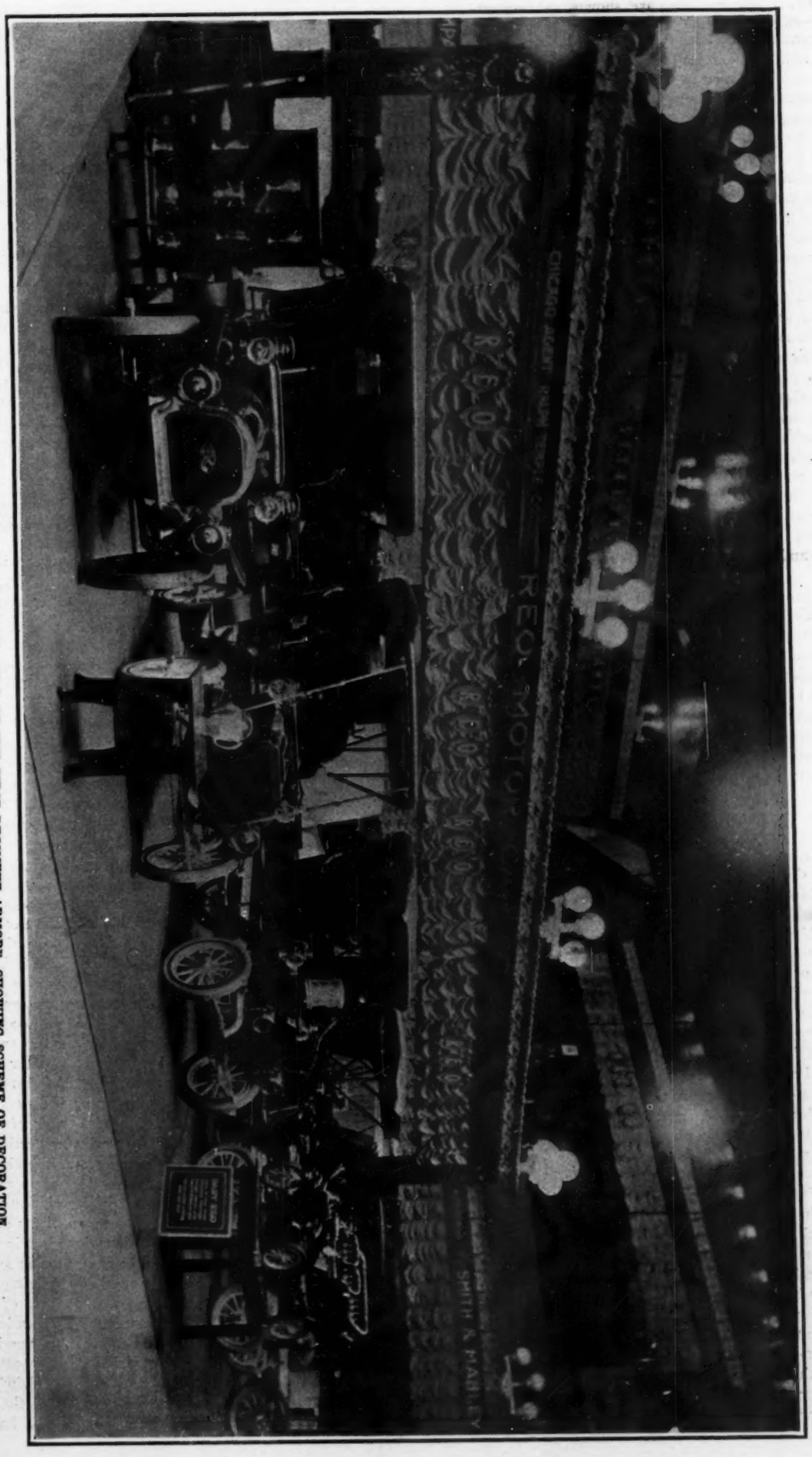
The exhibits of accessories and components are of considerable extent and include many of the best known houses in America engaged in the production of raw material and finished parts and fittings.

Exhibits in the First Regiment Armory.

WHEN the First Regiment Armory was opened to the public at 2 o'clock Saturday afternoon, the exhibits were nearly all in place on the main floor, all the debris of unpacking had been removed and the huge hall looked as fresh and orderly and clean as if there had been time to spare for arranging exhibits and cleaning house. And yet a view of the Armory two hours earlier revealed a confused mass of cars, chassis, crates and boxes, heaps of packing, cars being hurried hither and thither, the floor coverings hidden by débris, and outside an apparently interminable line of cars in the street, some on their own wheels but more of them ignobly carried on horse-drawn trucks, all awaiting their turn to be pushed into their places.

How the transformation was wrought it is impossible to say; but when the doors were thrown open and the band struck up, the visitor could only see broad aisles bordered by crimson carpeting, roomy exhibition spaces filled with shining cars and carpeted with green; columns surmounted by staff decorations in green and carrying huge white globes of electric light; and everywhere a restful harmony that was a strong contrast to the hubbub and confusion of an hour or two earlier. Only the rattle of ham-

ONE OF THE ALCOVE STANDS (WAYNE EXHIBIT) UNDER GALLERY IN COLISEUM—NOTE PANELING OF WALL IN BLACK WOOD AND BURLAP.



STAND OF THE REO MOTOR CAR COMPANY ON THE MAIN AISLE OF THE FIRST REGIMENT ARMORY, SHOWING SCHEME OF DECORATION.

mers, retreating before the visitors, and an occasional vacant space on the main floor remained to indicate that everything had not yet been done. A number of cars were delayed in transit and, not having arrived before the opening hour, were not in place; a few arrived during the afternoon, but were not allowed to enter while the show was open to the public. On the whole, however, the show was in a remarkably complete condition for the first day.

The exhibits of parts and accessories in the gallery were, generally speaking, in a backward state, but the Saturday afternoon crowd seemed to be looking only at complete cars, so the condition of the gallery mattered little and the hammer and broom continued their work undisturbed.

There was plenty of room for the cars shown at the Armory, the conditions in this respect being much the same as at the New York automobile shows; there was little or no crowding of cars and exhibitors seemed to be well pleased with their spaces. A feature of the main floor of the Armory is that there are no undesirable or out-of-the-way spaces; every space faces directly on an aisle, and nothing is hidden or obscured.

Perhaps the first feature to catch the attention of a visitor was the number of cars equipped with inclosed bodies. In this respect the show was like the New York shows. A majority of the spaces contained inclosed cars of some sort, and many exhibited cars with folding tops raised, adding to the impression that there were a great many bad-weather cars shown. A majority of the exhibitors also showed chassis, some being given a special exhibition finish.

Foreign manufacturers were well represented, no less than seven stands were devoted to cars built abroad, while at two stands were shown American replicas of foreign machines. The latter were the American Berliet, built by the American Locomotive Motor Car Co., which showed a chassis, a touring car and a limousine; and the Daimler Mfg. Co., of Steinway, Long Island, which exhibited an American Mercedes chassis. Both these exhibits were, like a majority of the exhibits in the Armory, brought from New York, where they were exhibited at the shows.

The exhibits of foreign cars included the English Daimler, a chassis being shown and also a complete car with touring body finished in gray; the Clément-Bayard, represented by a 24-horsepower chassis, a 60-horsepower chassis and a very handsome limousine with interior upholstered in gray cloth, exhibited by H. Sargent Michaels Co., of Chicago; a Panhard 24-32-horsepower limousine, a 20-horsepower Renault touring car and a 20-horsepower Delaunay-Belleville chassis, highly finished, shown by the Palais de l'Automobile, of New York; a Panhard 40-50-horsepower chassis and a limousine of the same rating exhibited by the Ralph Temple Automobile Co., of Chicago, the limousine being finished in black; two Renault cars, a chassis and a "town car," the former of 20-25 horsepower and the latter of 10-14 horsepower, shown by the Automobile Importing Co., of Chicago, the inclosed town car in particular being much admired; a Renault inclosed car apparently of the 10-14-horsepower type was seen at the stand of Smith & Mabley, of New York, where a Smith & Mabley Simplex chassis and complete car were also shown; and a de Leon large touring car, finished throughout in red, and an exhibition Hotchkiss chassis of 40-45-horsepower, the latter in particular being a center of attraction, shown by Archer & Co., of New York. All these cars were shown in New York.

There were very few exhibits that had not been exhibited at the New York shows and described in the New York show numbers of THE AUTOMOBILE. At an even half dozen stands there were complete cars that were not shown in New York, and exactly two-thirds of these were commercial cars. Among the pleasure cars a new machine which promises to be of technical interest was equipped with a four-cylinder four-cycle motor which, owing to the absence of the usual valve operating mechanism and to the peculiar arrangement of the piping, looked as though it was a two-cycle motor. Inquiry elicited the fact that the motor operates on the four-cycle principle, but instead of the usual valves there are sliding liners in the cylinders which alternately uncover and cover ports in the cylinder walls. The complete car and separate engine which formed the exhibit were only finished the day before the show opened and were not brought into the Armory until the evening. In the rush and confusion incident to getting the exhibits unpacked and set up it was possible to obtain only a few general facts, and a more detailed description will therefore be given in a future issue. The car and engine were shown by the Knight & Kilbourne Co., of Chicago, and, on account of the extreme quietness of its operation, the machine has been called the "Silent Knight."

No little attention was attracted by the exhibit of cars equipped with air-cooled motors whose cylinders rotated around a stationary vertical crankshaft. These machines, manufactured by the Adams Co., of Dubuque, Ia., embody a number of novel features, most of which are more or less familiar to readers of THE AUTOMOBILE. The motor is placed over the rear axle under the rear seat and the rear fitted to the touring car of this make is built as a storage place, having the capacity of a good-sized trunk. Two interesting broughams are exhibited of the same type and possessing the same mechanical features, but differing slightly in size. The peculiarity of this car is that it can be driven from the inside or from the outside, as may be desired; when being driven from the outside there is nothing to show that it can be driven from the inside, and *vice versa*. The front or outside seat is so arranged that the footboard can be folded over it, the car then looking as if equipped with a permanent down-curved front. Before folding up the dash the steering column, brake lever and pedals are removed from the sockets in which they fit in the footboard and are placed in similar sockets in the floor inside the car. A complete set of controlling levers is available for either inside or outside use. With the front seat open and an extra interior seat in use the larger brougham will seat seven persons; the smaller one seats five. In addition to the broughams and the touring car, a runabout was shown. This machine could be arranged for either two or four passengers by the use of a folding seat. The runabout was fitted with a three-cylinder engine rated at 20-25 horsepower, while the larger cars have five cylinders and are rated at 40-45 horsepower. The larger engine is a new one, though built exactly on the same principle as the older model.

The remaining four new exhibits, all commercial cars, are all examples of different types of construction. The Soules commercial car, of the medium weight class, driven by a double-opposed cylinder motor, will be described and illustrated in a later issue of THE AUTOMOBILE, and needs no extended reference here. Three cars were shown, one a delivery wagon with box body, top and wire screen sides, one an open box body express wagon with top and side curtains, and there was also exhibited a chassis showing the motor and other working parts exposed. The manufacturer stated that twenty-five of these cars had recently been sold on one order. In the heavy electric class the only representative was a huge five-ton truck shown by the Synnestvedt Machine Co., of Chicago. This machine was fitted with a very large platform for carrying bulky loads, and was easily the largest vehicle in the Armory. A placard attached indicated that the truck had been sold to Marshall Field & Co., of Chicago.

In the heavy gasoline truck class there were two machines, representing two different designs. The Kansas City Motor Car Co. showed a four-ton truck with a four-cylinder horizontal motor with opposed cylinders, rated at 60 horsepower, and the American Motor Truck Co., of Lockport, N. Y., showed a truck of the same capacity with a four-cylinder vertical motor rated at 36-40 horsepower. In both cases a number of interesting, and in some cases novel, details are involved, descriptions of which must, however, be reserved for a future issue.

Connections for electric power for showing machinery in motion were not made the first day, and the friction drive chassis of the Buckeye Mfg. Co., of Anderson, Ind., and other machines intended to be shown in operation were at a standstill, though the Lambert friction drive attracted the usual attention. The Reo "Baby" was always the center of a crowd, and the Reo Motor Car Co., of Lansing, Mich., had its space, one

AISLE STANDS IN THE COLISEUM ANNEX ON THE MAIN FLOOR—CHICAGO STEAMER AND TINCHER GASOLINE CARS IN FOREGROUND AND CENTER ARE CHICAGO PRODUCTS NOT SHOWN AT THE NEW YORK AUTOMOBILE SHOWS.

of the largest in the Armory, constantly filled with visitors. The Reo exhibit was the same in New York as in Chicago; in fact, with the exceptions that have been mentioned, the exhibits were practically identical with those shown in the East. The beautifully finished Frayer-Miller chassis and the handsome chassis of the Cleveland Motor Car Co., as well as the exhibits of the Rainier Co., of New York; the Berkshire Automobile Co., of Pittsfield, Mass.; the Dayton Motor Vehicle Co., of Dayton, O.; the Western Tool Works, of Galesburg, Ill., showing the Gale cars; the Moline Automobile Co., of East Moline, Ill.; the Lozier Motor Co., of New York; the Rapid Motor Vehicle Co., of Pontiac, Mich.; the Acme Motor Car Co., of Reading, Pa.; the Marion Motor Co., of Indianapolis; the Logan Construction Co., of Chillicothe, O., and the Moon Motor Car Co., of St. Louis, were all transferred bodily to Chicago, though in a few cases the exhibits had to be cut down, as in the case of a firm showing several types of pleasure cars and also commercial vehicles, there not being space for all of both. Among the exhibits that failed to arrive in time for the opening were those of the C. H. Blomstrom Motor Co., of Detroit, makers of the Queen cars, and John L. Dolson & Sons, of Charlotte, Mich.

An exhibit that attracted the attention of many of the fair sex was that of the Buffalo Electric Carriage Co., of Buffalo, N. Y., which showed a variety of small electric vehicles for pleasure purposes. The small electric commercial vehicle was represented by a delivery wagon shown by the McCrea Motor Truck Co., of Cleveland, a description of which is necessarily reserved.

The exhibit of parts and accessories was so incomplete that even a summary cannot be given at present. Judging by appearances, however, the exhibit will be an excellent one.

Taken as a whole, the Armory section of the Chicago show is remarkable for the wide variety of cars exhibited, each class being well represented by typical examples. The finest type of foreign car is there, as well as the American-made foreign machine; the American car, in all grades and all forms, is there; the electric car is much in evidence; gasoline motors are seen in all forms, both air-cooled and water-cooled; commercial machines, electric and gasoline, range from the largest the Armory doors would pass to the light delivery wagon; and so the list might be continued indefinitely. Thus, while there is perhaps less novelty than might have been expected, there is such a variety that the visitor's interest is attracted and held. The prospects for an exceedingly successful show are, apparently, excellent, and it is to be hoped that the Armory section of the show will not be overlooked by visitors on account of the greater size, though hardly greater interest, of the main exhibition in the Coliseum.

The Cuban government has waived all duty on touring cars for six months.

Auspicious Opening of Washington Show.

WASHINGTON, D. C., Feb. 5.—Beautified with bright-colored decorations and thousands of electric lamps, and with admiring throngs filling the aisles around the various stands, where automobiles and accessories of almost every type were to be seen, the interior of the Washington Light Infantry Armory presented a brilliant and animated scene on the opening to-night of the sixth show to be given by the Washington Automobile Dealers' Association.

With only two days in which to prepare exhibits before the evening of the opening, things were in a much more completed state than would be thought possible when it is considered that so many of the exhibits required complicated wiring. At the opening to-night several thousand persons were present, many by invitation of the dealers' association. They thronged the aisles, and the general opinion expressed on all sides was that the show was going to be a big success. The weather conditions are good and this will bring out the "good weather" people.

The collection of cars is the finest ever seen in Washington, a number being shown here for the first time. Among them are the Lambert, Auburn, Dolson, Jackson, Pierce Arrow, De Mar, Yale, Premier, Logan, and Reo. Agencies for these cars have been placed with Washington dealers, many of them since the New York shows.

While the local show is naturally attracting hundreds who have little intention of purchasing automobiles, many will get the automobile fever, and will fall in line with others and be in the great army of automobile users. It was noticeable to-night that many substantial business men of the city were manifesting the greatest interest in the automobiles displayed, and there was not a single exhibitor who did not secure a good list of "prospects." Many persons in official and social circles dropped into the show to get a glimpse of the 1906 models and, becoming interested in the many new things, stayed throughout the evening. In a word, it was the most representative crowd that has ever attended a local show and every exhibitor is wearing "the smile that won't come off." For a local show, the Washington exhibition is brilliant, and indicates at the start that it will draw the public better than any previous show.

After having examined all the exhibits, listened to the discourses of the various expositors, and noted the great advances made in automobile building since the last show, many visitors found a pleasing diversion by entering one of the company rooms to the right of the main door, where the Automobile Club of Washington has its headquarters during show week, and where it is dispensing hospitality of the substantial kind. The room has been decorated in pleasing style, with plenty of easy chairs, and proved one of the most popular features of the show.

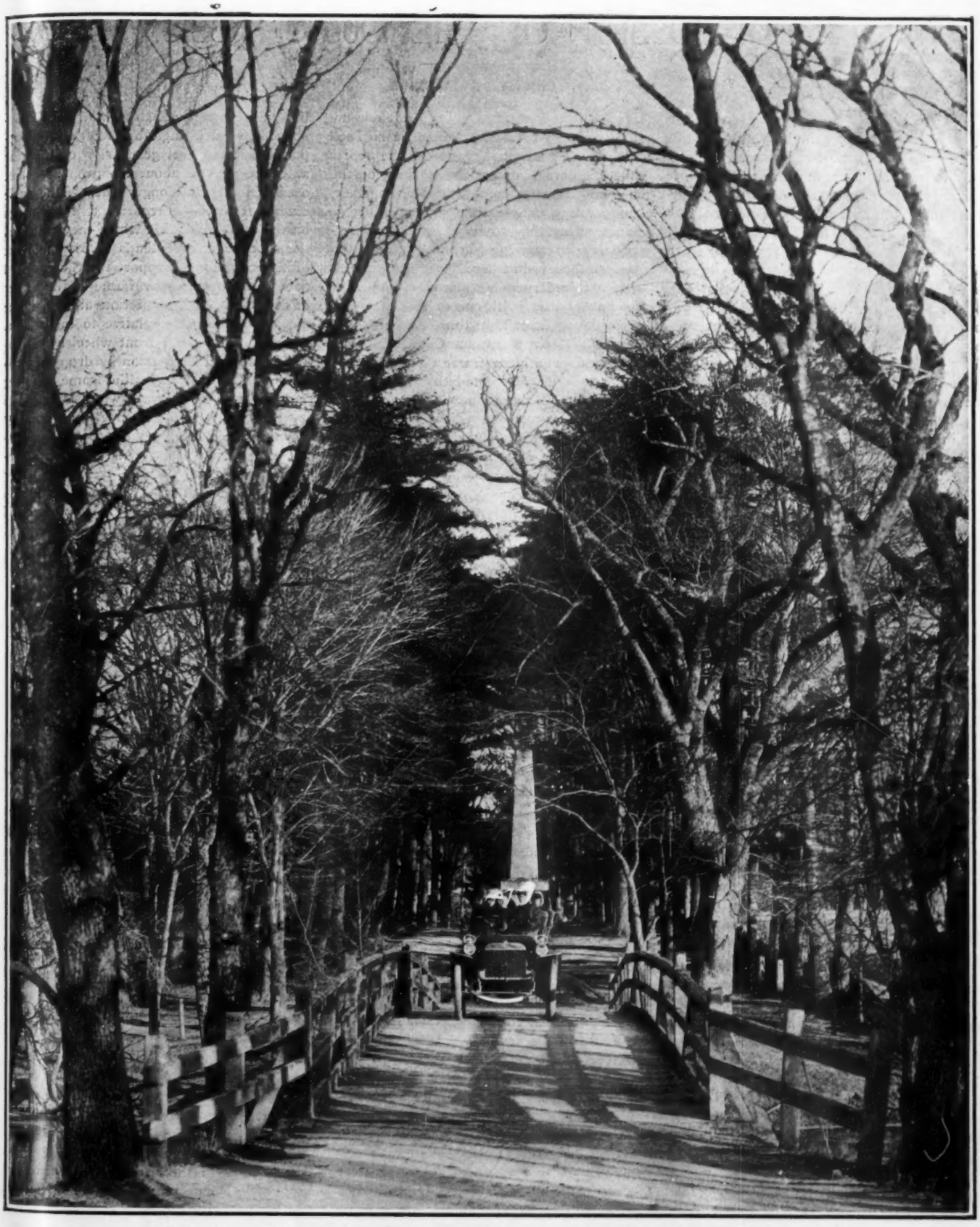
The full list of exhibitors is as follows, all being of Washington unless otherwise stated:

Pope Mfg. Co., the full Pope line of cars and sundries; Cook & Stoddard Co., Locomobile, White, Franklin, Cadillac, Baker; Washington Electric Vehicle & Transportation Co., Columbia gasoline and electric vehicles; Haughton Automobile Co., Yale and Premier; S. J. Meeks' Sons, Lambert; Willard Automobile Co., Jackson and Dolson, Swinehart tires; H. A. Rhine & Co., Haynes and Auburn; Thomas & Helbert, Maxwell; Commercial Automobile & Supply Co., Wayne and Logan gasoline and De Mar electric vehicles; Reo Motor Car Agency, Reo; National Automobile Co., Thomas, Packard, Buick, Studebaker, and Oldsmobile; Motor Car Co., Baltimore, Md., Peerless and Stevens-Duryea; Chas. E. Miller & Bro., Ford, Columbus electrics, and Indian motorcycle; Southern Automobile Co., Baltimore, Pierce Arrow; Electric Storage Battery Co., Philadelphia, Exide batteries; National Electric Supply Co., Michelin, Samson, and Harburg tires, Solar and Rushmore lamps, Gabriel horns, Foster shock absorbers, and tops of the Auto Top & Cover Mfg. Co.; Rose Mfg. Co., Philadelphia, Neverout lamps; Rudolph, West & Co., sundries; Wm. C. Robinson & Co., Baltimore, lubricants; Voorhees Rubber Mfg. Co., Jersey City, N. J., Voorhees tires; Detroit Motor Works, Detroit, marine engines; Automobile Tire & Repair Co., Hercules tires; Truscott Mfg. Co., motor boats and engines.

READY FOR PHILADELPHIA SHOW.

PHILADELPHIA, Feb. 5.—Making no claims to "the greatest show on earth," the automobile exhibition, which will open in the Export Exposition Building, this city, two weeks from next Saturday, will in every way be worthy of this city. Despite the 100 per cent. increase in space over last year, Manager Chester I. Campbell has been compelled to turn away a number of would-be exhibitors. A few of the late ones were taken care of in corridors, passageways and odd corners, but those who had cars to display were of necessity forced to go away disappointed.

Arrangements for the show are well in hand, the music, decorations, programmes and lighting being in the hands of committees which have practically completed the details of their several duties. The decorators and electricians only await the turning over of the building on the Monday preceding the show, to get to work, and it is the intention of Manager Campbell to have a complete exhibition ready for the first visitor on opening night.



A REVOLUTIONARY RELIC.

CROSSING THE CONCORD (MASS.) RIVER IN A WINTON AFTER A VISIT TO THE MONUMENT MARKING THE BRITISH POSITION IN THE FIRST BATTLE OF THE WAR OF THE REVOLUTION. POSTS AT RIGHT NEAR FENCE MARK BRITISH GRAVES.

A DISCUSSION OF THE 1906 CHASSIS.

By FORREST R. JONES, M.E.

ONE of the greatest achievements of engineering skill is the production of the automobile chassis. Materials of the greatest strength and durability are combined in forms that give extreme lightness and the utmost rigidity of construction, while presenting beautiful outlines pleasing to the eye. And over all its motions there is such perfect control that it seems almost a thing of life when promptly responding to the touch of a skillful driver. Yet without its almost discarded forerunner, the bicycle, no such rapid development could have been possible, for the successful efforts to secure extreme lightness united with great strength in the pedal-driven machine, brought forth materials and structural forms far in advance of anything before produced. Not the least of these is the pneumatic tire, without which little attention would have been given the bicycle, and which makes high speed so comfortable and free from jar or shock in the heavier machine.

The two recent exhibitions of automobiles in New York City showed considerable tendency toward uniformity of chassis construction in pleasure cars, especially of the larger sizes. There can hardly be said to be much approach to uniformity in small cars of the runabout type or light tonneaus with one or two cylinder engines. One is strongly impressed with the increasing predominance of internal combustion motors.

In freight trucks and delivery wagons no uniformity has yet been approached, although no greater diversity of lines has been shown than in pleasure vehicles. The motor is more often placed under the body of the truck, however, than in the latter, and motors similar to those for pleasure vehicles are used. The tendency, however, is to bring the motor back nearer to the rear axle, which it drives, in freight than in pleasure cars.

One of the greatest steps in automobile practice has been the production of a low-priced gasoline car with four cylinders, the design of which shows the greatest ability and thought on the part of the designer in eliminating all unnecessary parts, combining and simplifying those necessary, and putting them together in a substantial manner so as to make the machinery easily accessible, and to permit removal of parts necessary to give access to those that are encased, without disturbing adjustments requiring some time to make. If the materials and workmanship on such a car prove as serviceable as the design is excellent, it will be a powerful factor toward producing important changes in automobile practice.

The ultimate form of pleasure automobiles will be such that examinations, adjustments and repairs to the motor and power transmission parts can be made from the sides and above. There should be no need for pits and elevated tracks in the repair shop and garage, except for working on the body and frame when putting them together, or separating, or work of a similar nature.

In treating the chassis it becomes necessary to separate pleasure cars into two classes, those which are large and driven by four-cylinder engines placed in front, and the smaller cars, with one or two cylinders of the runabout or light tonneau type.

Large Pleasure Cars.

Beginning with the frame of large pleasure cars, it may be noted that the pressed steel channel is almost universally employed without reinforcement. Few cars have a channel reinforced by wood, while one frame is made of wood entirely except the fastenings. Wood reinforced by steel, and armored wood appear in isolated cases. In the majority of frames the sides are straight as are the end members, and the four pieces together form a rectangle.

The tendency is toward elimination of the narrowed or contracted front end of the frame. Many builders, however, have retained the contracted front, and in isolated cases there is a gradual tapering toward the rear, and sometimes elevation of a short portion of the rear.

The sub-frame for carrying the engine and transmission has become less frequent than heretofore. The more common practice is to support the engine directly on the side members of the frame and the transmission on crossbars also running from side to side, or to place the forward end of the engine on long struts across the front angles of the frame, supporting the other parts as mentioned. One machine presents the unusual method of supporting the engine by a steel apron, which is trough shaped with flat bottom and straight, sloping sides, the sheet metal being thick enough to form a rigid support for both engine and transmission. The apron is attached to the side members of the frame and holds it rigid to risist deformation at the front angles; short braces are used in the rear angles. While the steel apron has been adopted in several cars, this appears the only one in which it is used alone as the support of the engine. In other cars the engine and transmission are supported upon cross members in the form of I-beams, channels or angles, and the apron serves only for protection against foreign matter.

Practically all the frames of heavy machines are supported at four points over the axles. There is one notable exception to this, however, where a compound frame is used, consisting of the regular rectangular super-frame, and in addition a triangular sub-frame, shaped much like the letter V, but with the top closed by a straight member. The sharp angle of the frame is supported at the bevel gear drive of the rear axle and swivels about the propeller shaft bearing. The two longer sides of the angle extend from the gear drive to the springs on the front axle upon which they rest, and the short member extends across the front of the car, with a support for the forward part of the rectangular frame at the center of its width, the connection allowing free motion of the parts relative to each other. The lifting of either front wheel by an obstruction or its depression by dropping into a hole in the road leaves the frame standing as level as if the forward wheels were on a level roadway, and does not introduce any strain in the frame, at the same time allowing each spring to carry its correct proportion of the load. When one of the rear wheels is elevated or depressed, the body is tipped accordingly, but the condition of freedom from strain in the frame continues the same as when tipping the front axle. One who has ridden over our country roads and has seen his car run on three wheels at times, and has suffered broken springs in consequence will appreciate this or any other construction which allows flexibility to meet uneven surfaces and chuck holes. The common practice of supporting the frame by four points over the wheels makes a car very satisfactory for city streets and good roads as well as one which does not tip so readily on rounding curves rapidly and is generally satisfactory, but is not best for the poor roads which predominate so completely in the rural districts of our country. The conditions are similar to English and American practice in railway locomotives. The rigid frame of the former is entirely suitable for the excellent roadbeds of England, but would not answer for our more uneven tracks. Hence the more flexible American locomotive with its system of equalizing levers.

Springs, with few exceptions, are semi-elliptical both front and rear. Full elliptical springs are used to some extent in the rear as well as platform springs, and the three-quarter elliptical still remains on a few cars, chiefly in the rear. The provision for lubricating the pins of springs shows a commendable attention to the small details toward making a car comfortable, quiet and durable.

There is a tendency toward more rigid construction in the parts which form the supporting connection between the engine and sliding change speed transmission gears, thus eliminating the necessity of a coupling of great flexibility between the two. A completely rigid support for engine and transmission is a desirable feature in connection with the elimination of any flexible coupling.

Axles are generally of forged steel or cast bronze. The I-section predominates for dead axles. It has been almost universally adopted for the front and dead rear axles. One car uses a tubular axle reinforced by a strip of steel placed vertically inside and setting against the top and bottom of the tube. (Fig. 1.) With the live or floating rear axle the hollow section is necessary of course, and the circular form is common.

A castor type of swivel for the steering knuckle has received most favor by designers. Tilting the tops of the front wheels away from each other so as to bring the bottom more nearly under the swivel of the steering knuckle is followed to a large extent, and this construction serves to make steering easier and relieve the swivel pins of bending stresses in proportion to the

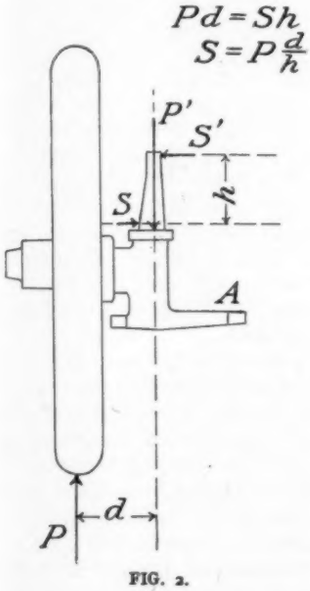


FIG. 2.

amount that the bottom of the wheel is brought in. Roller or ball bearings at the bottom carry vertical thrust of an amount equal to the load carried on each wheel when the swivel pin is vertical. The top of the castor pin is usually supported by a plain bearing only, since it resists only a comparatively small amount of side pressure, although ball bearings are sometimes found here. Ball bearings are used commonly in the front wheels, and roller bearings on the rear live axle. When the latter is dead, as is the case with double chain drive, ball and roller bearings seem to have about equal preference for the rear wheels. The latter conditions also exist for the floating axle drive when the wheel is supported on the dead tubing which is the rear axle, and surrounds the floating drive. Cone roller bearings have found considerable application for wheels.

Effect of Tilting Front Wheels.

The effect of inclining the front wheel so that the bottom is brought nearer to the middle line of the car, as shown in the greater ease of steering thus secured, can be understood by reference to the sketches—Fig. 2

FIG. 1.

shows the wheel vertical and Fig. 3 the wheel inclined, the axis of the knuckle swivel remaining vertical in both cases. When the wheel is vertical, the distance measured horizontally between the point at which the swivel axis if extended would touch the ground, and the center of the area of contact of the tire with the ground is the distance d measured in a direction parallel to the front axle.

When swinging the wheel and knuckle around as is done for turning a corner, the resistance is the friction due to the pressure of the swivel against its bearing. The friction of both swivels must, of course, be overcome in turning the knuckle. The friction of the knuckle is proportional to the pressure upon it, or at least very nearly so. The weight resting on the knuckle is of course equal to the pressure of the rod against the wheel. The latter is indicated by P and the downward pressure on the knickle by P' According to the statement already made, $P = P'$. The side pressures against the swivel are two equal forces, S and S'. Of these S acts horizontally against the lower cylindrical surface of the swivel pin, pressing against the side next the wheel, and S' acts horizontally also, but at the top cylindrical surface of the pin and in the opposite direction. The value of S can be found by equation $Pd = Sh$ from which $S = Pd/h$.

By inclining the wheel, the intensity of the side pressures on the pin is reduced. In Fig. 3 the inclination has been such as to make the distance between the axis of the swivel pin and the line of pressure upward against the wheel one-half as great as before. It is shown as $\frac{1}{2}$. The smaller side pressures are indicated by $s=s'$, and in the same manner as before, the value of s is found to be $s=Pd/2h$; that is, the horizontal force is one-half as great as when the wheel was vertical. The pressure downward on the knuckle joint remains the same as in the preceding case, still being $P=P'$. The reduction of friction in the knuckle swivel is therefore due only to the lessened side pressure on the pin.

Four-Cylinder Motor Predominates.

The four-cylinder engine largely predominates, the six-cylinder appearing to but a small extent. The tendency is more toward units of one cylinder, twin cylinders apparently not being in so much favor. From the viewpoint of the owner, the one-cylinder unit is more desirable on account of less expense for repairs in case of a damaged cylinder, and in general greater ease of removing the cylinders. While the completely closed cylinder head, except openings for ports and ignition plug, is desirable from the point of view of the user, yet many constructors have found it best to make an opening in the center of the head large enough for a boring bar to be used in machining the bore of the cylinder, or for grinding or lapping the bore. With carefully fitted steel plugs the danger of leakage about the plug is probably not great enough to require serious consideration. This is not true of cast-iron plugs.

In the water-cooled engines the majority have inlet and exhaust valves on opposite sides of the cylinder, and two camshafts are used when all valves are mechanically operated, as is the rule in the four-cylinder type of engine. A large number of machines have all valves on the same side of the cylinder, however, thus using only one camshaft. In unusual cases automatic inlet valves provide the means of having the inlet and exhaust on opposite sides of the cylinder with only one camshaft, but the more common construction is to place the automatic inlet immediately over the exhaust. In the water-cooled machines, which largely predominate, the camshafts are nearly always placed in the bed of the motor, and the valves are lifted by a direct vertical thrust of the cam followers pressing against the valve stem.

Air-Cooled Motor Valves.

In the air-cooled machines the valves are almost invariably placed at the top of the cylinder either with the stems vertical or inclined away from each other at the top. Great diversity is shown in operating the valves, although the mechanical method is practically the only one used on air-cooled motors. The necessity of introducing a rocking beam when the camshaft is in the bed of the engine, or of making the cam act by pressing its follower downward, the latter having a finger which extends out to

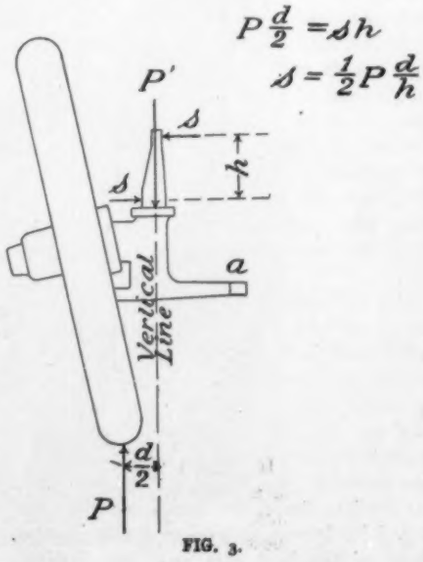


FIG. 3.

press down the valve stem, has, on account of the complicity of parts in rapid motion, induced some designers to run the camshaft above the cylinder heads parallel to the crankshaft, and operate both the inlet and exhaust valves from it, using a vertical shaft with bevel gear drive at both top and bottom for transmitting power from crankshaft to camshaft. One air-cooled engine rotates the cylinder about a stationary transverse shaft, the drive being from parts attached to the rotating cylinders.

The tendency toward more universal adoption of removable valve seats that can be taken out together with the valve so that worn parts may be easily reground or renewed, and the use of yokes for holding the removable parts in place, including valve boxes and inlet and exhaust pipes, is increasing. The use of yokes instead of the older method of several bolts or studs and nuts for attaching such parts is a great improvement. By the older method it was more difficult to get a good joint, and the time for attaching and removing was much greater. Sprung flanges and leaky joints, especially on the exhaust, were not uncommon. While many yokes use but one bolt, several extend over two parts and have two or three bolts.

Cast iron is nearly always used for the cylinder and piston. The stroke in the majority of cases is a little longer than the diameter of the cylinder bore, but variations are found from 15 per cent. larger bore than stroke, to 15 per cent., or even 20 per cent. longer stroke than diameter of bore.

Crankshaft Construction.

The crankshaft is quite generally supported on ball bearings, most cars having three, but several using five supports for the shaft. Ball bearings are also used on the crank end of the connecting rod. The plain cylindrical bearing is also much used; in fact, several machines have plain bearings throughout the entire engine. While ball bearings unquestionably reduce the frictional resistance when starting from rest and at slow speeds, there is a question as to whether they have less friction than plain journal bearings when running at high speeds and well lubricated, as by the splash method with suitable oil holes and grooves, or by ring oiling.

When the space available for the length of crankshaft is small, ball bearings have the advantage over plain journals of occupying less length of shaft. The selection of them may sometimes depend on this property.

The material of the crankshaft is naturally of the best quality. In high-priced cars nickel steel is in common use. In the best practice the crankshaft is machined out of the solid slab. The materials for plain bearings on the crankshaft have gone through the same steps as in stationary engine practice. In the latter Babbitt metal was used in the earlier types and then discarded for bronze, but taken up again later. Many of the best cars now use Babbitt-lined bronze bearings. A good Babbitt alloy has a lower coefficient of friction than bronze, this property insuring a reduction of frictional losses in the motor, and also has good wearing qualities. It is probable that the Babbitted box will remain.

Accessibility to the crankcase by the removal of a comparatively small hand plate has been given more attention than heretofore, and the suspension of the crank from the upper part of the bed is growing more common.

One four-cylinder machine has adopted an excellent arrangement for entire accessibility to the crank, cylinders and piston by dividing the crankcase vertically through the middle, and arranging the crankshaft supports so that when half the case is removed the shaft is supported by a single bearing. Upon removal of the latter the connecting rod and piston can be taken out without disturbing the cylinders or the pipes connected to them.

Materials Used for Clutches.

Metallic clutches are gaining in favor both in the multiple disk and the expansion types. This is following the lines of development in other classes of machinery long since worked out. As a comparison of the evolution of the friction clutch, it is notable that in electric traveling cranes the multiple disk and expansion clutches are the ones which have proven more satisfactory, the leather-faced cone clutch having been quite generally discarded. One of the chief objections to the leather is its tendency to seize suddenly and bring undue strains and jerks on the machinery, and, as it grows old, to become glazed or oil soaked, both of which cause slipping, and necessitate unduly high pressure between the friction surfaces. There is a more general application of flat springs under the leather for forcing it into more gradual contact with the mating part. Radial acting plungers forced out by coiled springs are also more common for the same purpose.

The materials of the rubbing surfaces in multiple-disk clutches vary. Steel on steel is often used, and less frequently bronze on steel. The materials in expansion clutches are usually different, bronze on steel or on cast iron being common. Ample means of lubrication are provided, one being the oil bath. The film of oil that gets between the surfaces when the clutch is released serves as a cushion, which is gradually squeezed out when closing it, and allows gradual starting. This is best secured by the use of numerous oil grooves in the friction surfaces. From ten to thirty disks, 6 inches or slightly more in diameter, are used.

An interesting way of illustrating the great turning effort that can be transmitted through a multiple-disk clutch of comparatively small diameter closed by a light pressure is that of taking two visiting cards or strips of paper and laying one partly over the other, with a paper weight on top, and then pulling them apart horizontally, noting the pull necessary to slide them over each other. Then take a dozen or more similar cards and pile them up with the ends overlapping about half their length, placing the same weight on top of the pile and pulling them apart as before. The force required will be surprisingly greater than for the two cards. The necessary pull is in proportion to the number of pairs of rubbing surfaces in contact.

Selective Sliding Gears.

Selective sliding change-speed gears are growing in favor with manufacturers, several having changed from the step-by-step type to the selective, while those that heretofore used selective levers still retain them. Planetary gears are, by the very nature of their construction, also selective. One car with sliding gears is equipped with a ratchet in the back gear, which meshes with its mate on the propeller shaft in order that change may be made from direct drive to slower speed quickly and without releasing the clutch. Change-speed gears are made larger and more powerful with a more general use of chrome nickel steel in their construction for securing both strength, toughness and hardness, all requisites for the service they must perform.

The square shaft for the sliding gears is still in much evidence, although some makers use a shaft with four feathers machined from the solid, thus securing ease of sliding and ample strength.

The direct-drive positive clutch which has been made with two or three large jaws on each member to a considerable extent has been replaced more completely by the type in which a spur gear fits into a corresponding internal gear, the latter type giving greater ease or throwing the parts into engagement, and removes the tendency for the jaws to hammer against each other.

(*To be continued.*)

COLLEGE WANTS AN AUTO.

Champaign, Ill., Feb. 5.—The Illinois Agricultural College may make use of the automobile for a novel purpose. It is now planned to use several of them in making tours of the state in making soil investigations. Up to this time the college force has sampled the soil of nearly every county in the state. Heretofore teams have been used in traveling about during spring, summer and fall. It is believed that an automobile equipped with the paraphernalia required to take care of such a business may be run about the state to very great advantage, and that more work will be accomplished by the use of such a conveyance. At times forty men are required to attend to the experiments that are being made in different fields of the experiment station and those located in different sections of the state.

E. R. Thomas, well known in automobile racing circles, has ordered a White steam racing car, to be the largest ever built by the White company. It will probably be entered in the next Glidden tour.

TENDENCIES IN CAR DETAILS AT SALON.—II.

By RENE M. PETARD.

(*Continued from page 86, issue of January 11.*)

PARIS, FRANCE.—Having thus completed the study of the carriage part of the automobile at the recent Salon—that is of the simplest, but not least difficult part of the machine to design and manufacture soundly—we may now pass to the study of the active organisms which give the life and the power necessary to the propulsion of the motor car.

Beginning with the very source of all sorrows as well as of all pleasures, we shall first survey the motor in its various shapes, giving this omnipotent master of the car all the attention which his important functions entitle him to.

In France the horizontal motor is dead. Dying it was last year, passed away it is this year. Two European makers only exhibited it in the Serres annex, and even then what they showed were merely samples intended to rid them of the stock they had accumulated in older days. It is true to say that Cadillac and Oldsmobile who pluckily came to plant the Yankee flag amongst the proud Europeans also do show it, and not from old stock either, but it must be borne in mind that we do not take them into account here, this report concerning only the European built machines.

Inclined or V-placed cylinders are still to be seen in some bashful instances on runabouts, and in full glory on practically every motorcycle, but not on a single pleasure car, although Darracq may, perhaps, lead them to victory with the now famous 200-horsepower eight-cylinder sprint racing car, which is fitted with V engines, working on four throws of the crankshaft—that is, two cylinders on each throw.

Aside from these few exceptions, probably intended to merely confirm the rule, the vertical cylinder stands boldly, undenied master of the situation. The universal adoption of this style of engine has in consequence caused the also almost universal adoption of the Mercedes type of hood, that is, the type with a vertical radiator in front and folding tops and sides to cover up the machinery. Three notable exceptions only are to be found on this point; they are the Renault, the C. G. V., and the De Dion, who keep their characteristic shapes of old, the two former at least, since the latter comes to the Mercedes type for the medium and the high-powered cars of his manufacture.

POSITION OF MOTOR.

Racing car construction shows its influence in the position of the motor on the frame. The engine is now generally brought very far back on the chassis, the radiator being usually placed no further forward than the vertical plane of the front axle, this giving all machines, even of low power, an appearance of speed and power which is now considered as one of the conditions of beauty for the automobile, while at the same time this fashion puts the machine in the very best conditions of steadiness on the road and of stability, as well as making the mechanisms under the hood more accessible.

This last mentioned item of accessibility has apparently been one of the principal thoughts of the designers this year, and it has resulted, so far as the power-producing portion of the car is concerned, in increased simplicity; the time-honored array of rods, levers, castings, pipes, valves, and similar nuisances, as regards repairs, having gradually disappeared, or at least shifted away to some more convenient place.

As was mentioned before, the four-cylinder vertical motor now stands supreme. For any power above 12 horsepower, no other type of motor is so found, except in some cases where six-cylinder machines can be noticed. This is, however, not to be taken just now as an improvement bound to replace the four-cylinder motor, as some people, especially in England, seem to believe. The six-cylinder motor will still have a long fight before it becomes standard practice, as its undoubted technical advantages are probably more than balanced by practical difficulties. The three-cylinder motor presented itself in the same light two years ago, and yet it has now disappeared. Time alone will be the judge. The single cylinder motor finds a number of adepts in the small two-seated car class, but the two-cylinder is rapidly dying; 1906 is a year of "one or four."

AIR-COOLED CARS.

Air cooling for very light machines might possibly materialize. We already mentioned under a different heading the small Italian Otav air-cooled. Under the name of "Guy" we find a small four-cylinder 12-horse-

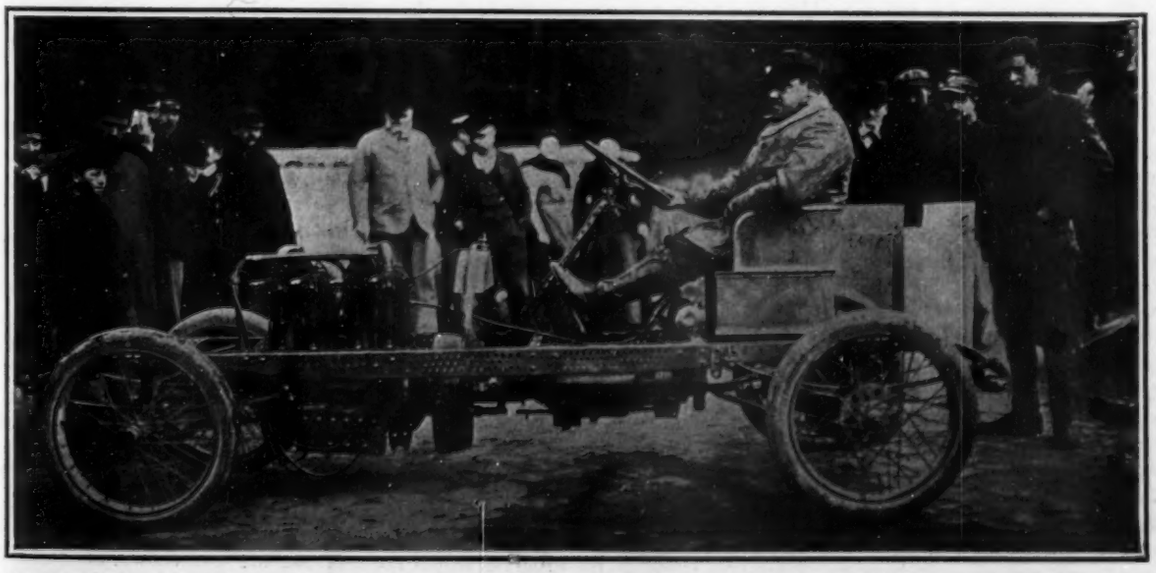


FIG. 1.—VULPES AIR-COOLED 18-24-HORSEPOWER SPECIAL SPRINT RACER, WITH WHICH BARRIAUX BROKE THE KILOMETER RECORD FOR CARS WEIGHING 900 POUNDS.

power air-cooled machine with ordinary bicycle cylinders placed tandem under an ordinary hood with a wire net in place of radiator and a flywheel fan; this, however, should not be considered as representative as it is the work of but a very small concern. We also find as air cooled the 18-24-horsepower Vulpes special sprint racing car(Fig. 1) on which Barriaux recently broke the kilometer world's record for cars under 900 pounds, but this cannot be considered as a

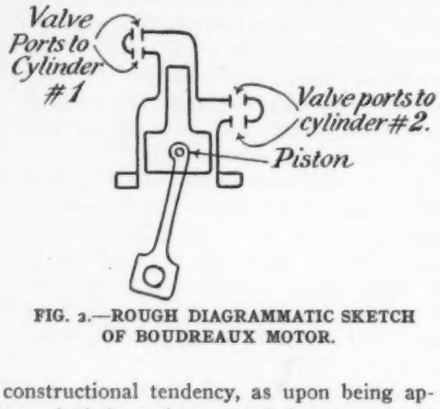


FIG. 2.—ROUGH DIAGRAMMATIC SKETCH OF BOUDREAUX MOTOR.

constructional tendency, as upon being approached the makers stated that they would not accept to supply a motor of that type to a buyer.

What is more important is the promise of the F. N. company, the largest motor shops in Belgium, to make for next year an 8-10-horsepower four-cylinder air-cooled small car.

Motors of Special Construction.

Passing to practical engines of a type out of the ordinary, we only distinguish amongst a number of freaks the well-known Gobron-Brillié and the Boudreaux, which reverts to an old system to make two cylinders out of one, as per the rough diagrammatic sketch, Fig. 2.

The tendency concerning valve situation in the usual type of motor has already been discussed. To sum up the situation in this respect we might say:

First: General tendency for town and general service cars; valves all on one side over single camshaft.

Second: Tendency for fast touring cars, heavy machines, and powerful, fast motors; valves symmetrically placed on both sides with two camshafts.

Third: Overhead tappet actuated and automatic inlet valves disappearing.

Before leaving the subject of cylinders, a few lines might be profitable concerning their general design as regards the manufacturer. The original practice in automobile building has been to cast the cylinders in ordinary gray iron, the water jacket being made integral with the cylinder proper. In order to obtain greater lightness, and to avoid inequalities of expansion under the influence of the working heat, the most advanced practice for some time was to make the cylinder proper separate and turned inside and out, so as to have a symmetrical and as light as possible barrel over which a separate jacket was fitted for the cooling water, the head and valve chamber forming a third piece bolted on. C. G. V. and Panhard adopted this practice at the beginning of the century and the latter went so far as boring the cylinders out of a solid steel billet.

This practice was somewhat altered by Mors at about the same time, their process being to hydraulically force a bored-out steel liner inside a cast aluminum base common to the four cylinders and forming at the same time the crankcase top and the cylinder's water jacket.

The practice of making these assembled cylinders became almost general around 1902, but it was soon found that for prolonged, hard work it was not possible to make joints that would properly hold between the cylinder and its jackets unless some quite special systems (which were soon patented) were used. Besides, such a construction is rather expensive. The net result is that this system has now been entirely abandoned by the majority of makers, the only ones keeping it in France beingPanhard on his racing machines, and Sultan on all motors; in Belgium, Germain, and in England, Arrol-Johnston—the two latter for all their cars, even 'buses.

A half measure which is extensively followed, and is on the increase, to make the water jacket walls integral with the cylinders but with very large inspection holes, covered by screwed-on plates, this being now the standard C. G. V. practice, and carried to its utmost in the Renault 1905 racing car, in which the cast jacket walls were just a skeleton jacket covered by screwed-on copper plates hammered by hand to a suitable shape.

Pistons and Crankshafts.

After the cylinders, the most important parts are evidently the pistons and the crankshaft and their connecting members and accessories. Of the pistons nothing new can be said; the practice stays where it has been for years. The much lauded pressed steel pistons, which some experts from the back of the shop had been promising as revelations, did not make their appearance and are probably not to be regretted, although a condemnation would be quite as without foundation as praise, practice having not had a chance to say its decisive word.

While studying crankshafts some pretty fine pieces of machinery were found, especially several six-throw shafts of as much as five feet in length of relatively small diameters, which make one think twice when visualizing the face of the man who breaks one on the road side, if he knows the price.

Leaving monetary considerations aside, such crankshafts as were exhibited on the lightest grade of cars are perhaps the most conclusive proof of the progress which the advent of the automobile caused in metal working trades. These were made of the hardest grades of nickel and vanadium steels, turned out of the solid ingot, bored through the pins for lightness, and milled at the throw arms to carefully studied H or other sections for the same purpose. These shafts are hardened and tempered at the bearings, the arms being said to be left soft, and the whole shaft is ground true as a final finish. Such construction had so far been used only in the very highest grades of racing cars, but is now working its way down in touring chassis, though usually in only the most expensive ones.

A French concern, the Motobloc, shows a distinct departure in crankshaft construction. In their machines the flywheel is placed between two bearings, between the two middle cylinders of the motor, the crankshaft consequently being built up of two pieces. This construction, which does not present any apparent advantage, is only useful in the case of this machine on account of the firm's principle to place the clutch and speed gearing in an extension of the crankcase.

The tendency is becoming universal to attach the crankshaft bearings to the top of the crankcase so that the lower part can easily be detached for inspection without disturbing the adjustments.

Five bearings crankshafts are slightly more numerous than the three bearings type.

Concerning Bearings.

As regards bearings, the two-point contact ball type is certainly gaining in popularity for crankshafts, as well as for all other parts of the machine. Up to last year crankshaft ball bearing users were few and far between, and the bearings they used were all of the D. W. F. type, with compensating springs and felt washers to separate the balls and give a certain amount of diametrical elasticity to the bearing.

It appears, however, for 1906, that although a number of the first users of the

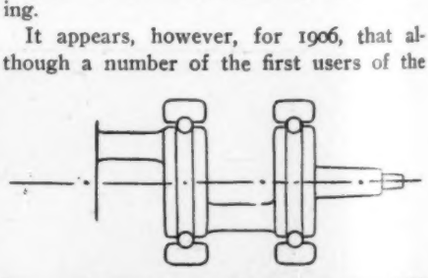


FIG. 3.—SPECIAL CRANKSHAFT BALL BEARINGS OF DUTCH CAR.

type of bearing mentioned have continued its use, the majority of the converts to the ball system are using the ordinary two-point annular type without any separating part between the balls, the remainder using types with separate balls but made upon principles different from those of the D. W. F.

On a car hailing from Holland and selling almost all its output to England, a crankshaft was shown in which the inner ball race or ring instead of being slipped

over the shaft was made integral with them, the outer diameter of this ring being larger than the double throw of the crankshaft, as roughly illustrated by the sketch, Fig. 3.

This construction goes towards reducing the number of parts in the machine and increasing the *apparent* simplicity of the whole, but entails the use of an extremely costly crankshaft which has the further disadvantages of being made out of good ball bearing steel, which does not necessarily mean good crankshaft steel, and also of making the cost of repairs prohibitive.

Where ball bearings are not used, ordinary special phosphor bronze lined bearings are used, those lined with antifriction metal being very scarce. In this type of bearings lubrication is of the utmost importance; in consequence this will make necessary some consideration of the important question of lubrication.

Proper Lubrication.

Proper lubrication in an explosion motor, whatever may be its construction and its system of cooling, is an absolutely vital matter, as many readers will probably have already learned at their own expense.

If care from the user to see that proper attention is given to that part of the operation of the machine is thus an absolute necessity, there is also a vast deal of care required from the designer to see that the oiling system be such, in certainty and efficiency, that the owner's pains be well repaid. The question is not to flood anything that moves in any manner with an enormous amount of oil, as then even if the permanent damage would not be as great, it would mean just as vexatious little delays as underlubrication would cause.

It is evident that under no circumstances should more oil than necessary reach the pistons, as any surplus oil will work its way past the rings and on top of the piston itself in just about no time, and there play general havoc with the plugs and valves, which then will soon get just as gummy and sooted as heart cannot desire. In a study of the lubrication systems exhibited it is found that the great majority of makers appear to consider the problem as requiring a virtual division of the engine in two sections, the means of lubricating which are to be different in order to obtain a reasonably simple system.

The two sections comprise: First, the main bearings and the camshaft and accessory bearings, the connecting rod big end bearings. The second part comprises the connecting rod small end bearings and the pistons and cylinder walls.

The old splash system, which for years gave excellent results on the entire mechanism of the motor, is being generally abandoned by the generality of French makers, except for what we have termed the second part of the engine, for the benefit of which it still reigns supreme.

De Dion-Bouton were probably the first, a few years ago, to adopt on their two-cylinder 10-horsepower motor a pump forming part of the engine and taking oil from a sump in the bottom of the crankcase to send it in large quantities to the main parts of the engine, this having, however, evidently been done before in machinery of a class different to that in automobiles. Their system consisted and still consists in sending the oil under the pressure supplied by the pump to the main crankshaft bearings, wherefrom it follows leads bored out through the crankshaft itself to the connecting rod big ends. The considerable centrifugal force set up in these parts splashes it to the different other parts of the engine such as connecting rod top, pistons, and distribution mechanisms, through suitable openings.

Delaunay-Belleville adopted this same practice from their very start in automobile manufacture last year, but instead of the spur gear pump used by De Dion for the purpose, they have preferred to adopt the eccentrically actuated rocking plunger pump, working without valves of any description, which was successfully used by them for years in marine machinery. They further improved this system for 1906, in which, while retaining the same principle of pump and splash, they have drilled the connecting rods through so that the oil is forced up the rods to the piston pins, wherefrom it goes in a circular trough formed around the inner face of the pistons. From this trough the oil reaches the frictional or outer face of the pistons through small holes suitably drilled through the piston walls.

Among makers fitting a special oil pump to the engine to lubricate it in the manner described, we find Mercedes, Rebour, Prunel, Radia, Aster, and others. It will be noted that with this system the oil is used over and over again, as that which has been splashed to the walls drips down again to the sump (where a sort of a gauze filter is generally fitted) and is pumped back to the working parts, the system being often compared to the continuous circulation of blood in the human body.

The comparison is, however, defective, as it very clearly points out the defect in this system. In the human body the heart pumps the blood to have it purified (oxydized) before sending it again to the arterines; in the engine the pump takes the already used and consequently impure and already slightly carbonized oil to send it again to the working parts, so that after a period which is generally 200 miles, on the majority of French cars, the oil which has been getting "worse and worse" all the time has become worthless as a lubricant and has to be changed. If pure oil is simply added, it will mix with the used up oil and the result will be double or almost double the quantity of an impure oil, while if the user will take the trouble to empty the sump entirely and fill it again with pure oil, the proper course will have been followed, but at the expense of time spent on a rather nasty job.

This system, however, presents the important advantage of having no long pipes to freeze and clog, as all the oil leads, being contained in the engine itself, are kept constantly warm, while the oil is working under a high pressure, generally 2 to 2 1-2 times the atmospheric pressure, so that obstructions are not possibly allowed to stay in the leads. The only moving part is the pump, and this is a strong and large part, very unlikely to give trouble, while there are no outside connections and pipes to give trouble, leak, or break.

The system, however, possesses the drawback of being rather expensive, one reason why a number of makers still prefer the perhaps less expensive methods of forcing and distributing the oil by outside means. In the latter case, the oil is placed in an independent tank from which it is forced to a row of sight feeds conveniently placed, generally on the dashboard, and thence it drips into pipes leading it to various parts, in quantities just sufficient to replace the oil on the parts as it is used up, splash being used as an auxiliary. In this case, except for what is supplied by splash, it is always pure, clean oil that reaches the working surfaces, but the system is nevertheless probably inferior in that it is much more liable to break down than the former.

The methods employed to force the oil to the sight feed vary, sometimes pressure from the exhaust or the water jacket is supplied direct to the tank, while at other times special small plunger pumps actuated by means of belts, chains, or eccentrics are used. Departures from these two systems are found on several Italian cars, where the delicate small pumps used to supply the sight feeds are dispensed with, their place being taken by a light shaft inside the oil tank carrying tiny pulleys, and driven through light chains from an upper equally small shaft with similar pulleys, the chains on these shafts being fitted with small buckets, just like a miniature grain elevator. These buckets deliver the oil they contain, when they reach the upper shaft, into pockets forming the top part of the sight feeds.

A device which might be classed with the lubricating means first described is the Cornilleau-Sainte Beuve, in which the oil pump feeds its large quantity of oil to a set of short pipes, fixed to the outside of the crankcase, these pipes supplying the oil to nozzles, which spray it to the different parts of the motor, the surplus oil falling to the bottom of the case, to be pumped out again.

The power-generating and transmitting portions of the engine having thus been examined, we shall now turn our attention to other parts, which might incorrectly be termed accessory parts, the word not being quite proper, since the engine could not be operated without them in the present status of our knowledge.

(To be continued.)

"SMALL" AND "POPULAR-PRICED" CARS.—II.*

By RENE M. PETARD.

PARIS, Jan. 20.—Leaving the interesting Sizaire & Naudin machine, we will pass to the S. V. P. small car (shown in outline Fig. 1), made by the Société des Voitures Populaires, in which the end aimed at by the designer also was to do away with all unnecessary components and to simplify as much as possible the parts which must of necessity be preserved, so as to be able to make a machine in which quality of material and quality of workmanship will in no way be reduced in comparison to that of even the very best grades of cars. A quality to be found in this car (as well, by the way, as in the one previously described), and which is generally lacking in cars of the same price and capacity, is that of harmony and unity of design; by this it is meant that in this machine every single part, even the less important, shows evidence of having been thought out specially for its work and to harmonize with its surroundings.

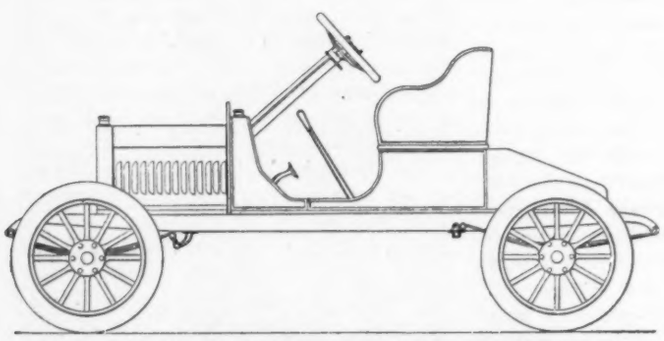


FIG. 1.—SMALL CAR OF SOCIETE DES VOITURES POPULAIRES.

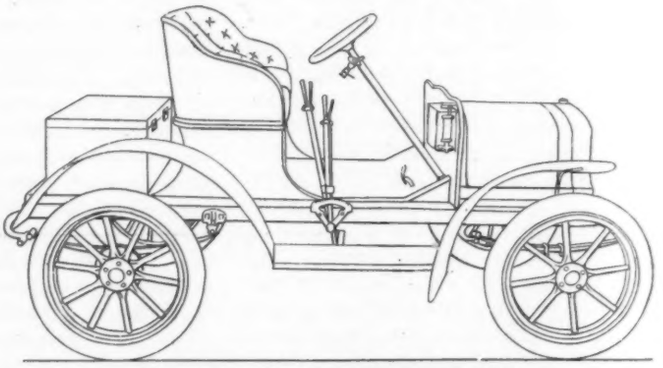


FIG. 4.—LE PASSE-PARTOUT SMALL CAR.

The motor is a vertical single cylinder, having its mainshaft crosswise on the chassis, and located underneath the usual type of folding hood; the valves are both mechanically operated and the ignition is by a low-tension Simms-Bosch magneto, with mechanical make and brake inside the cylinder. The carbureter is automatic, the supplementary air supply being regulated by an automatic poppet valve placed on the side of the mixing chamber casting, while the cooling is by a gear-driven, centrifugal water pump, sending the water into the engine, wherefrom it returns through large diameter piping to the top of the radiator, which forms the front of the hood in the ordinary way. This radiator is of the finned tube variety, and the tank is formed around it as in big car practice. The whole of the power plant gives evidence of scientific and practical design.

The speed-changing mechanism forms a single block with the engine, and is consequently also placed crosswise under the hood; it is of the sliding-gear type, giving two speeds and reverse with a single lever, the drive being direct on the high gear. The shafts of this part of the machine are all mounted on two-point ball bearings (Hess-Bright type), made by the D. W. F. Co., which supplies a large portion of the bearings used by the French makers.

The preceding parts, although especially designed to reduce cost, show little if any entirely new departures from current practice; it is now that such alterations will be found to a greater extent. First in the transmission, which, instead of being through gears or chain, as is usual, is by means of a special belt formed of chrome leather, working on edge, and disposed as shown in the sketch (Fig. 2). This belt has been used for some time on machinery and in cases of special duty, and this is the first instance of its application to the driving of automobiles. The results seem gratifying, and if only the public would give up a little of the prejudice which is so often found against belt drive the great advantages of this in silence and smoothness would certainly be appreciated. The clutch is entirely dispensed with, the belt being simply slackened sufficiently when a free engine is desired. It is said that a special apparatus is fitted to this car which creates a tension on the belt proportionate to the driving pull required from it, but no details could be had concerning it, the man at the stand being rather shy to give details.

The belt drive in this machine should work quite well, as it is absolutely protected from outside agents of disturbance, such as mud, wet, or dust, and also because the distance between pulley centers is exceedingly long. The drive from the belt is to a pulley keyed on the rear axle's driving shaft, which is also mounted on two-point ball bearings. This axle is peculiar, inasmuch as no differential is fitted, the fastest revolving wheel when taking a curve simply revolving free on its axle end, until the speed of the rear wheels become equal again.

This construction, which had been given up a long time ago for heavy and high-powered cars, seems to be enjoying a revival since several concerns are attempting to bring it back to life.

The usual brakes are fitted—that is, one (foot-actuated), working on the driven belt pulley, while the side lever actuated brakes are located inside drums on the rear hubs, where they work in oil, being consequently of the internal expanding type.

The front axle is of tubular construction, and the Lemoine type of knuckles so arranged that the axis of the pivot meets the ground at the center of the tire's surface in contact with the ground, thus assisting very materially the claim of irreversibility made in respect to the steering gear.

Another new two-seated small car shown was the Otav, exhibited and made by the well-known Italian bicycle and motorcycle firm of Turkheimer. This machine is well worthy of interest, especially because it was the only notable example of air-cooling at the show. It has an armored wood frame carried on springs—modeled after the Oldsmobile runabout—which are clamped to tubular axles resting on bicycle type tension wheels.

The motor is a 5-horsepower single vertical cylinder under the hood in front, and is fitted crosswise in the car, as shown in the engraving, Fig. 3. The inlet valve is automatic and is fed by the vertical tube seen in picture, this tube coming from a very simple automatic carbureter. The exhaust is led into a small silencer underneath the footboard. The cooling arrangement is on the same principle as that of the American Frayer-Miller car. On one side of the engine crank case, in which the flywheels are enclosed, a second casing is

Continued from page 180, issue of January 18, 1906.

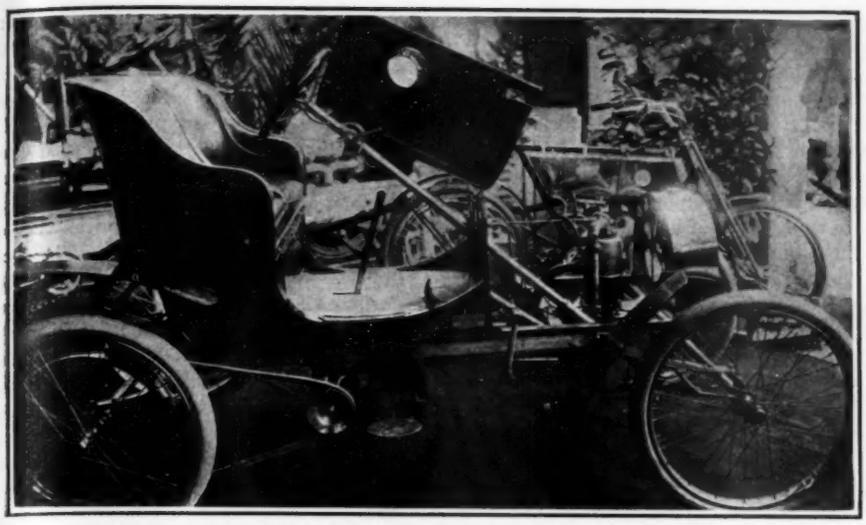


FIG. 3.—AIR-COOLED 5-HORSEPOWER OTAV SMALL ITALIAN CAR.

bolted which is of the full diameter of the crank case and contains a powerful ventilator. This ventilator takes air from its center and by centrifugal action sends it to a vertical lead, wherefrom it is violently blown on the center of the cylinder head, and then descends along the cylinder walls, which are fitted with a narrow cast jacket for the purpose of forcing the air to a close contact with the heated parts of the engine.

The shaft extension, which carries the blower, further carries a small chain sprocket which drives a countershaft under the footboard. On this countershaft are keyed three pulleys of the motorcycle V belt-driving pulley type, one being keyed at each end of the countershaft and the third at the center of the shaft. The extreme pulleys are used to drive each of the rear wheels exactly as in a motorcycle, while the middle one is used as a drum on which a foot-applied brake contacts. The clutch is fitted at the rear sprocket of the chain drive before mentioned, and the machine is without a differential, the slip of the belt being supposed to attend to the differences in speed of the two driving wheels. The hub brakes are applied by means of wire ropes, attached to the second foot pedal.

The engine is controlled by hand levers on the spark and throttle, these levers being fitted on the steering pillar, below the wheel, and their motion being transmitted through Bowden flexible wires. The motor is started by means of a crank fitted behind the front right-hand mud guard, the motion of which is transmitted by a bicycle chain to a free wheel clutch on the engine's main shaft. The gasoline is carried in a large tank in front, which takes the place of the usual water tank. This fuel tank has a large opening in its center to permit an air draught on the engine, the air that thus passes through the tank being at the same time intended to prevent any rise in temperature in the tank, which might possibly be warmed up by the radiation from the motor.

Machines of not so special a construction are the Passe-Partout, the Hellée, and the Prosper Lambert, which are simply reduced and cheapened models of the standard type of automobile.

The Passe-Partout, Fig. 4, is undoubtedly the most advantageous one of the three, both as regards price and workmanship. The frame is of armored ash wood, with an angle steel subframe, the tread of the machine is 3 1-2 feet, and the wheelbase 6 feet. The car is fitted as the buyer prefers with a De Dion or a Buchet motor of 6 horsepower, the De Dion being fitted with automatic inlet valve and the Buchet with a mechanical overhead inlet valve actuated by a push rod and rocking lever. Magneto ignition is fitted supplementary. The clutch is of the direct leather cone type, the clutch actuating pedal applying the countershaft brake when pushed to the very end of its range of action. The change speed gear is worthy of special notice, as, although it is not new, it is a well-made

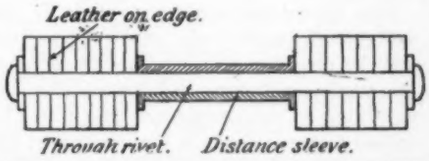


FIG. 2.—SECTION OF BELT DRIVE OF SMALL CAR OF SOCIETE DES VOITURES POPULAIRES.

and durable example of a type which was discredited, rather undeservedly, by some poorly-made and short-lived imitations. In this system the outer appearance is exactly similar to that of a sliding gear system, namely, two parallel shafts, inclosed in a

FIG. 5.—CHASSIS OF PRIMA FOUR-CYLINDER SMALL CAR AS EXHIBITED AT THE PARIS SALON.

stationary aluminum gear case. But there the resemblance stops. The gears inside are constantly in mesh, there being no direct drive on any of the speeds. The gears on the primary or driving shaft are rigidly keyed to same, while those on the secondary shaft are idle on it and are kept from all lateral motion by the length of their hubs and also by special sleeves which are interposed between them. Keyways are, however, cut inside the gear hubs, while the secondary shaft—which can be slid without sliding the gears it carries—is formed with feathers which come in engagement with any of the gear wheels, thus causing the drive to be transmitted through any of the pairs of gears at the driver's will. A neutral position is of necessity provided between each speed change. There are three speeds and a reverse in the case of this particular machine. The drive is by propeller shaft to a strong rear axle. The steering is irreversible, being of the worm and sector type. The same description equally well applies to the Lambert and the Hellée cars, the only difference being that in these two machines ordinary sliding gear transmission is used. Their prices are also higher.

The Demeester small car, made by the well-known motorcycle racing man, can well be considered as a transition between the small car proper and the popular car, according to the significance which was attached to these words in the opening of this article.

This machine embodies in its mechanism most of the features of the popular car, and can only be classed with the small car on account of its carrying capacity, which is comfortably and safely limited to two passengers. The frame is of pressed steel, with forged spring horns. It carries on a low subframe a four-cylinder 8-horsepower motor, the four cylinders of which are cast in one single piece with the top of the crankcase. The bore and stroke are respectively 2 3-4 and 3 inches. The valves are mechanically operated on each side of the engine over separate camshafts, and the flywheel is external but does not contain the clutch. The ignition is by coil and battery or high-tension magneto, as the customer may prefer. The radiator is a tubular construction, giving the appearance of a honeycomb; the water circulates through it by thermo-syphon or natural circulation.

The clutch is of the metal-to-metal adjustable expanding type, contained at the front of the gear box and inside of it—it does not give any axial thrust. All the bearings except at the crankshaft are on balls, two points system, the speed change gives three speeds and reverse with direct drive on the top gear. The drive is taken by a propeller shaft to the rear live axle, which is also mounted on balls, with ball thrust bearings wherever any end pressure is to take place. All three brakes on wheel hubs and propeller shaft are internal and absolutely inclosed, working in oil. The hub brakes are balanced by means of a cross beam. The steering is by worm and sector, with engine controlling levers on top of the wheel. The wheelbase is 6 feet 6 inches, and the tread 3 feet 9 inches. The wheels are 28 inches, with 3 1-2-inch tires. The consumption of fuel is one-quarter of a gallon of gasoline for 10 miles, and the maximum speed with two up 40 miles an hour on good roads.

Absolutely the most striking example of the popular car exhibited in the Salon was the Prima machine, shown by L. Lefebvre, and said to be manufactured *a l'Americaine*. Inquiry showed that the machine was made in Paris, but that the construction being undertaken in fairly large quantities, the maker's advertising pretension was somewhat justified. This machine met with a fair amount of success with the general public, and favorable agencies are said to have been placed for foreign European countries. It is shown in Fig. 5.

The Prima machines are made in the single-cylinder, 8-10 horsepower, and in the four-cylinder, 10-12-horsepower sizes. The

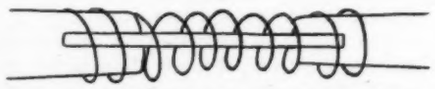


FIG. 7.—COUPLING CONNECTING PUMP AND CAMSHAFT ON PRIMA CAR.

chassis dimensions, the general appearance, and even all the mechanical details, are exactly similar in both machines save for the length of the crankcase and the number of cylinders. In these machines the engine and gear box are made as a single component, consisting of three gray iron castings, bolted together at their ends, the whole being bolted at the front end to the front cross member of the frame underneath the radiator, by means of three stout bolts, and at the rear end to the central cross member of the frame in the same manner, no other means of securing the power plant to the frame being used. The frame is of pressed steel, narrowed out at the front, and is carried on four half-elliptic springs of good length, but perhaps rather weak in section. The drive is by propeller shaft, with two cardan points, the rear one being of the rounded-square sliding type to allow for end play. The front one is of the ordinary two jaws and central cross type. The wheels are 28-inch artillery, and are fitted with Dunlop corrugated tread tires as a standard. The hubs are malleable castings; this is to be regretted, as more suitable material could easily have been secured without any appreciable increase in price, considering the quantities said to be manufactured. The front axle is tubular and sweeps downwards, its ends are brazed into Renault pattern cast knuckles. The steering is of the rack and pinion type, and all the connections are ball and socket. The steering wheel is of fair diameter, and it is (as well as its pillar) absolutely free of any lever or handle of any kind.

Turning now to the details of the mechanism, the accompanying sketch, Fig. 6, shows the general arrangement of the different parts to make them a unit, as before explained. The trough-shaped casting *S* is intended to be of steel in future, but was of bronze in the machines exhibited. This casting, which forms a half-circle in section, would be of about 8 inches in diameter if the circle were completed, and is about 10 inches long. It contains the extensions from the engine's shafts—the crankshaft extension, which carries a small pulley for the fan's round belt, and the starting crank's pin, the front end of the casting carrying the starting crank proper. The camshaft extension carries a sort of simplified Oldham joint, which is as shown in the rough sketch, Fig. 7. The ends of the pump and camshafts are slotted for about 1-2 inch of their length by a saw cut, a flat sheet steel plate of the same width as the diameter of the shafts, of the same thickness as the width of the saw cut, and of sufficient length, connects both shafts. It is dropped in the slots and is prevented from falling out by means of a coil spring which covers the whole and extends for a fair length over both shaft ends. The water pump, which is of the gear type, is itself contained inside this trough-shaped casting, as well as the jump-spark timer. This is rather unusual in construction, for the shaft which carries it (the camshaft) extends right through it to the pump. This trough is also to contain the driving mechanism for a high-tension magneto, this being fitted as an extra.

All the valves are placed on the same side of the cylinders, over a single camshaft, and are mechanically operated. The cylinders are cast in pairs. The situation and shape of the exhaust lead are quite in evidence in the accompanying photograph, from which, also, the respective positions of the inlet and exhaust valves will

FIG. 6.—ASSEMBLED CASTINGS OF CRANKCASE AND GEAR BOX OF PRIMA CAR.
E, Engine crank case. G, Gear box. S, Front support. M, Central cross member of frame. F, Front cross member of frame. C, Starting crank. P, Propeller shaft and Cardan joint.

readily be seen. In order to avoid the complication of an inlet piping, the carbureter is placed on the opposite or right side of the engine, and the passage to the single inlet valve chamber (used for each pair of cylinders) is formed integral in the casting between the two cylinders, and opens at the other side of the motor where a very short elbow connects it to its side of the carbureter. The water circulation is by pump, as before mentioned, the water being taken by the pump at the bottom of the horizontally coiled, finned-tube radiator, and sent to each of the cylinder castings through a brass lead just visible in the photo above the front wheel; the water then leaves at the top of the cylinders to go to the large tank above the radiator.

Compression release taps are fitted in the top of each cylinder's combustion chamber, while the sparking plugs are placed above the inlet valve. The plugs closing the valve inspection holes are held down by a single nut and a yoke for the two valves of each cylinder.

The crankshaft is of the ordinary four-throw type, the flywheel being placed inside the gear box and carrying the clutch in a drum formed on its rear face. This clutch is of the metal-to-metal expanding type; it merely consists of a band expanded by a toggle lever action, actuated by a central sliding cone under spring pressure, the arms bearing upon the cone being fitted with rollers to reduce wear. The gearing gives three speeds and a reverse. The drive is direct on the top gear, but the secondary shaft and the reverse pinions are constantly in mesh and thus rotate continuously. The reversing set is held in its place by a coiled spring.

The bearings in the gear box as well as throughout the car are of the single-piece bronze sleeve type, with no provisions for adjustment, except the central crankshaft bearing. A drum is carried at the rear of the gear box upon which acts an external band brake—camel-belting lined. The hub brakes are of the same type, although larger.

The back axle is of the ordinary live type, the wheels being carried by the driving shafts and not by the axle tube. There are no spring horns at the back, the springs being shackled direct to the frame sides. The torsion rod system is simple and efficient, but was described elsewhere.

In the one-cylinder machine the general lines are the same, the difference being simply in the engine which carries a single cylinder with consequently a shorter length for the whole power plant. The flywheels are in this case internal and form the crankshaft as is the usual practice, the flywheel inside the gear box being nevertheless preserved identically as in the four cylinder model.

The general lines of the engine are similar, the camshaft being directly above the main shaft and the valves being side by side in front of the cylinder, crosswise in the car.

The price of the single cylinder chassis with the tires and long enough for a short side-entrance body is $380, while the price of the four-cylinder chassis is $780. These prices are ridiculously low, and if this only is considered the car is certainly excellent value for the money. It is unfortunate, however, that better materials should not have been selected for some of the parts, as this would not have increased the price appreciably and would have made a better vehicle for hard work. It seems to be the general opinion that the makers of this machine overdid their desire to make a wonderfully cheap car with a big capacity. They made a machine less expensive than the average small car, while the French public was prepared, and will probably prefer to pay more than the price of a small car for such a machine—of course to a reasonable amount justified by increased quality.

(To be continued.)

Westrumite in America.

Westrumite, which has been used so extensively in Continental Europe for laying dust on the roads, especially those selected for the great automobile racing routes, is now being manufactured at a plant established last fall at Whiting, Ind. Attention was drawn to the process in America by an experimental treatment of two miles of the Midway drive in South Park, Chicago, which has developed such satisfactory results that the further use of Westrumite is urged as a preventive of dust, mud, and other undesirable road surface conditions.

In the stretch treated, two treatments of a sprinkling of a 10 per cent. solution, 90 per cent. water, were used, a day intervening between the applications; then three applications, eight or ten days apart, were used with a 3 per cent. solution, with the result that the surface layer has become caked to such an extent that neither wind nor traffic raises any perceptible dust, and the water during a rainfall runs off the surface, so that mud formation is prevented.

The basis of Westrumite is crude mineral oil, so treated that it possesses the quality of solubility in water, rendering its application an easy matter. While the results attained are declared to be in every way as favorable as those following treatment of a road with crude oil, the disadvantages of the latter are absent. Westrumite has no perceptible odor and forms such an intimate contact with the particles composing road surfaces that there is no tendency to mud formation from rainfall.

The manufacturers, the Westrumite Company of America, claim the greatest possible advantages of their product as a binder for road building, and state that the thickness of the road-body may be materially reduced because of the impermeability of surfaces treated with the preparation.

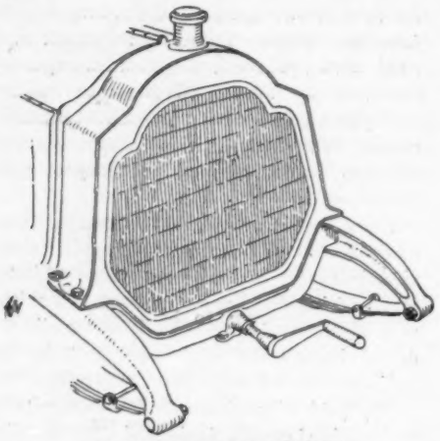
The field of usefulness of Westrumite is not confined to the laying of dust on dirt or macadam roads, for it is recommended as a superior substitute for oil, tar, and asphalt in road building of all kinds. In laying stone block, wood, or brick pavements, a solution of 25 to 50 per cent. of Westrumite is used to saturate the sand foundation of the blocks, and this is claimed to entirely prevent the sand from driving up the joints under pressure from heavy traffic.

For macadam road construction, a 25 per cent. solution is recommended, to be used in combination with the binding material and the sand, and a 5 to 10 per cent. solution sprinkled in front of the road roller. The amount of rolling required is less, since the Westrumite binds the roadmaking materials together more rapidly than water, and so softening of the foundation and partial pulverization of the upper layer is avoided.

AUTOMOBILES AWAITING THE DEPUTIES AND SENATORS IN THE GRAND COURT OF THE PALACE AT VERSAILLES DURING THE ELECTION OF THE NEW PRESIDENT-ELECT OF FRANCE, M. FALLIERES.

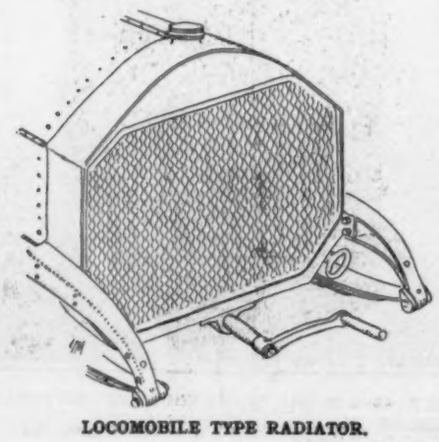
Cooling Systems in Water-Cooled Cars.

IF one may judge by the character of the radiators seen at the two New York shows, the supremacy of the square tube honeycomb cooler is nearing its end, and the



PACKARD TYPE RADIATOR.

popularity of the corrugated flat tube radiator is likewise on the wane. The reason is the same in both cases, viz., the liability of these forms of radiator to start leaking from vibration and straining of their supports, together with the difficulty of curing permanently leaks due to these causes. Perhaps the commonest type of radiator seen was that having a set of three or four flattened tubes bent zigzag and packed into a sheet-metal framing, with flanges stamped out in suitable shape to be strung over the four tubes. These tubes are connected at top and bottom, and the radiator has a miniature tank at the top for convenience in refilling. The base of the radiator is frequently a ribbed brass casting, which has no water joints with the tubes but serves simply as a support. In some radiators seen constructed in this manner, an overflow tube about 3-4 inch in diameter was arranged to connect the little filling tank with the lowest point of the radiator, apparently for the purpose of conserving steam or vapor that would otherwise be lost. In addition, however, a regular overflow tube was supplied.



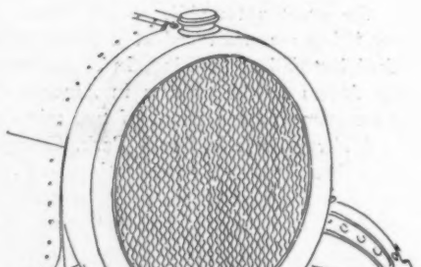
LOCOMOBILE TYPE RADIATOR.

In other radiators of the air tube and semi-honeycomb types the brass pump casting was likewise used for its strength, but in this case it necessarily formed an integral part of the radiator structure.

Other radiators, in which supporting lugs were simply soldered to the sheet-metal sides, were frequently arranged to be supported on the front cross member of the frame, which was dropped to pass under the radiator, and the side supports served only to steady the radiator.

On the Fiat the radiator was supported on trunnions at the sides, leaving it free to rock slightly back and forth. The water pipes from the engine to the radiator were large and stiff, and the rubber hose connection was short and very firmly clamped to the pipes, evidently with the purpose of steadying the radiator.

The geared circulating pump, which at one time was almost completely dropped, because attempts were made to locate it above

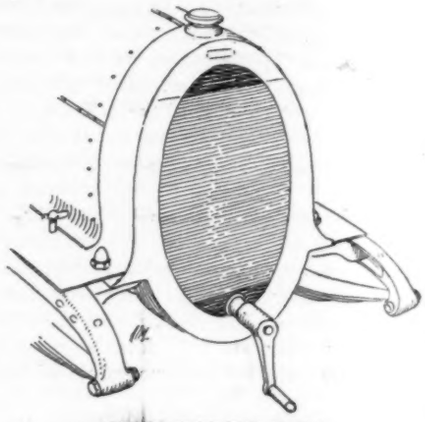


NATIONAL TYPE RADIATOR.

the lowest possible water level so that it was not self-priming, is being restored to favor on a number of cars; but the centrifugal pump still holds by far the leading position, owing, it would seem, to the fact that it does not wear out and that it will permit the water to circulate by gravity in case the pump should for any reason fail to feed.

Two cars at least, the Pierce and the Haynes, have eccentric pumps, consisting of a barrel revolving eccentrically in a pump chamber, and having a pair of blades working in the same diametrical slot, and pressed outward by springs cast in the walls of the circular pump chamber. The water enters close to the revolving barrel on one side and leaves at the same relative point on the other side. In the Welch the pump is built right into the radiator, and is run by the same shaft that carries the fan. Further particulars could not be definitely learned, but apparently the radiator is partitioned horizontally on the line of the pump, so that all the water has to pass through the latter before it can go from the top to the bottom half. The new Ford runabout likewise has a pump in the base of the radiator.

Exterior outlines in radiator (bonnet) fronts follow the designs of previous years,

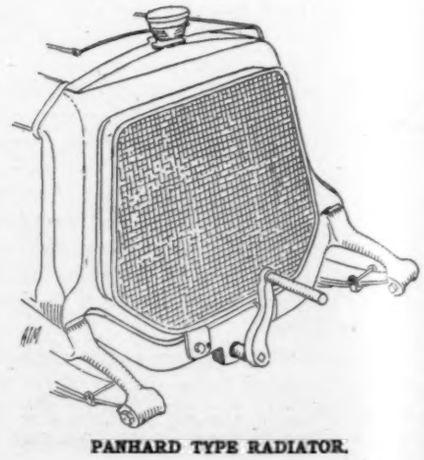


ARIEL TYPE RADIATOR.

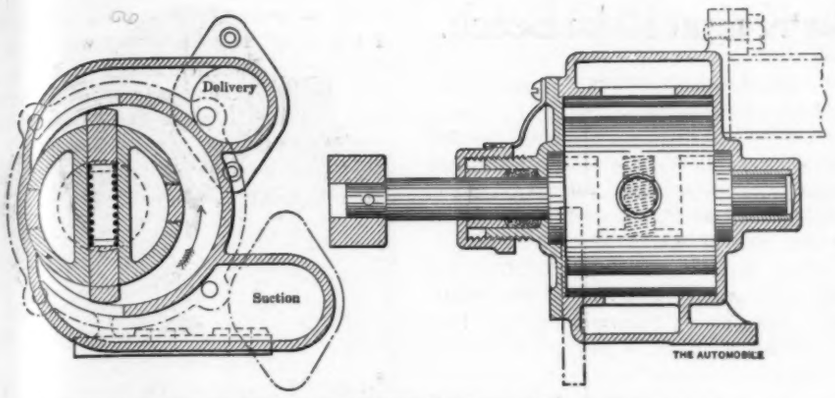
and in general the results are pleasing to an artistic taste. The circular front which has been charcteristic of the National cars, was seen also in the Delaunay-Belleville, exhibited here for the first time this year. A novelty is the oval radiator of the Ariel car which looks well and certainly gives a touch of individuality to this machine.

Atwater Kent Generator.

A device that concentrates in one unit the entire system for jump spark ignition, except the batteries and plugs, has been placed in the market under the name Atwater Kent Spark Generator, by the Atwater Kent Manufacturing Works, 44 North Sixth street, Philadelphia. It avoids the use of separate magnetic vibrators and distributor, all the required parts being contained in or on a single box, of the size of the ordinary coil box, which is attached to the dash. This box is shown in Fig. 1, on the following page, and the



PANHARD TYPE RADIATOR.



SECTIONAL VIEWS OF PIERCE ECCENTRIC ROTARY WATER PUMP.—See Page 350.

single vibrator is shown separately in Fig. 2.

Advantages claimed for this spark generator are its simplicity, convenience and durability and a great reduction of battery current consumption.

The principal feature is the mechanical vibrator which is attached to the exterior top of the box. This differs very much from the old style make-and-break sparker, which it resembles in appearance; it fulfills the functions of both vibrator and distributor. There are two platinum contacts, one at *D* and the other at the end of the screw *F*. The former is carried by the elbow lever *C* which is pivoted at *R*. A spring *J* normally keeps the contact points separated. Screw *F* is for adjustment of the points. Shaft *N* is driven by the engine and revolves counter clockwise and, for a four-cylinder engine, has four notches like the notches of a ratchet. As the shaft rotates it carries forward (left) over the top a small steel piece, *B*, termed a lifter. The forward motion brings the spiral spring *A* in tension. When the continued turning of the shaft releases the lifter from engagement with one of the notches the spiral spring returns it quickly to its original position. As it starts backward it raises the steel piece *C*, causing contact of the points at *D*. The contact closes the primary circuit and magnetizes the iron core of the coil. Then, before *B* reaches its normal released position it allows *C* to fall again, breaking the contact of the points, whereupon the core of the coil is discharged and a spark produced at one of the plugs.

This cycle of movement is repeated for each notch in the shaft *N*. All of the parts are made very light to permit of a very quick release and result in a sudden break that produces the same size spark for all engine speeds. With a four-cycle engine, shaft *N* is geared to turn twice for each revolution of the engine shaft, producing a spark for each explosion stroke. A flat spring *E* holds the piece *C* in position and the milled screw *G* locks the adjustment of the contact screw *F*. The spark advance lever is secured by screw *I*.

Instead of being broken in two places, as with the ordinary timer and vibrator, the current is broken in only one place, where the break is protected by the condenser of the coil and practically no arcing occurs.

The photograph of the generator complete (Fig. 1) shows one side with the

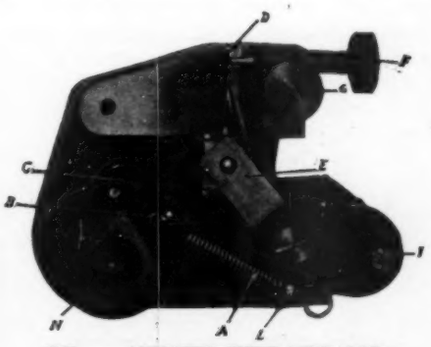


FIG. 2.—ATWATER KENT VIBRATOR.

cover over the vibrator removed. The cover is the same as the cover on an ordinary coil box. The four secondary current wires are led from the binding posts through the bottom of the box and thence to the spark plugs. One of the two primary current wires seen at the bottom of the box leads to the battery and the other is grounded. These six wires are all that are necessary for the entire system.

In the further side of the box is a removable high-tension coil without vibrator. Contact is made directly from the secondary of this coil to the longitudinal distributor *R*. A shaft *S* is supposed to be connected to the two-to-one shaft of the engine, and drives the distributor and also the mechanical vibrator on the top of the box. An advance lever *T* moves the vibrator for advancing the spark. The current is led into and out of the vibrator by sliding contacts, which allow this to be advanced and retarded without the use of moving wires. The advance lever can be connected to the hand advancer on the steering post in the usual manner. A two-point switch *W* permits the use of two sets of batteries if desired. A button *Q* projecting from the front of the box can be quickly pressed and released to close the circuit in place of the mechanical vibrator; this is for starting the engine on the spark, and the secondary current is distributed to the proper cylinder to start the engine.

Since the vibrator is mechanical and is actuated by power from the engine, producing only one spark at a time, it consumes no current that is not necessary for firing the cylinder charges, to which fact is due the economy of current consumption. There is only one adjustment in the entire device, and no moving wires. It is asserted by the Atwater Kent company that six small dry cells are sufficient to run a four-cylinder car from 1,000 to 2,000 miles, with this spark generator.

AUTO BOAT FOR LIFE SAVING.

ASTORIA, WASH., Feb. 1.—The life-saving crew at Cape Disappointment is the first on the Pacific coast to be provided with an auto boat. This has just arrived from the East, and is a rakish craft, thirty-four feet long, and in good weather has a speed of eight knots. It is to be manned by the entire crew of eight men at Cape Disappointment, headed by Captain Charles S. Stuart, who is in charge of the station.

It is understood that the auto boat is considered in its experimental stage in life-saving work, and in case the test here proves successful, the government will install them in the larger stations on the two oceans and the Gulf of Mexico.

To the often maligned toot of an automobile horn must be attributed the saving of at least one life. Called to the door of her home by the unaccustomed siren call, Mrs. William Vosseller, living in the vicinity of Plainfield, N. J., discovered a large cat lying across the face of her infant daughter, who was being smothered to death. The cat was driven off, and, after working over the child for some time, its normal respiration was restored.

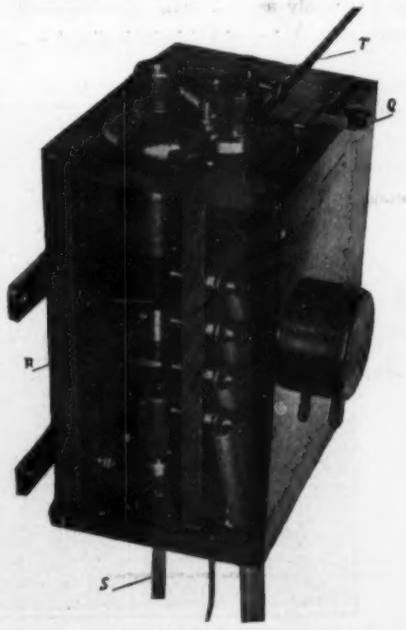


FIG. 1.—ATWATER KENT SPARK GENERATOR.

Bowden Crowned Auto Boat King at Palm Beach.

PALM BEACH, Feb. 2.—H. L. Bowden figured as the auto boat king of the second annual regatta on Lake Worth, his *Mercedes* capturing the greatest honor in appropriating the Dewar Shield. A year ago, on the Ormond-Daytona course, the athletic Bostonian had driven his racing automobile, *Flying Dutchman III*, the fastest mile of the tourney, and it was one of the two 60-horsepower engines used in that car that carried him to victory in the prettiest race of the entire regatta here this week. Undoubtedly it was such because all the contestants got away together, while in the other events the contests were of the processional kind because of time allowances.

The *Mercedes U. S. A.* made its first start on Tuesday, but engine troubles soon put it out of the running. Wednesday the Bowden colors came to the fore in the fifteen-mile event, which the *Mercedes* won in 44:01, with the *23*, owned by George Gingras, and fitted with a 25-horsepower Jaeger engine, in second place; time, 48:20. The other starters did not figure in the contest, except as "also rans."

Thursday the *Mercedes* prepared for the mile dash of the concluding day, and it was in this race that the Sir Thomas R. Dewar trophy was offered, the donor's condition being that it must be won twice consecutively before becoming permanent property.

The owner of the *Mercedes* was at the wheel with the faithful Basle in charge of the engine. The *23*, H. C. Thompson's *Limit*, of 30 horsepower, and Lieut. H. L. Willoughby's 30-horsepower, *Possum*, completed the quartette. The *Mercedes* got away in front and never relinquished the lead during the entire mile, timers Butler and Kerrison making the figures 3:06. The *23* was 28 2-5 seconds behind, and 21 seconds further in the rear was *Possum*, with the *Limit* well in the distance. Two trials were allowed, but the *Limit* declined a second opportunity. Again the *Mercedes* triumphed, with the *23* second and *Possum* last, the relative distances apart being about the same, except that the *Mercedes* did not extend herself as conclusively, going the distance in 4 seconds slower time than on the first trip.

Just to emphasize again the fact that his boat could go a distance, Mr. Bowden ran away from *23* and *Possum* in an event that continued for a little more than ten statute miles. The margin at the finish was 26 seconds, and it might have been greater had it been necessary.

One of the great disappointments of the meet was the failure of the famous *Dixie* to put in an appearance. E. J. Schroeder, of Jersey City, the new owner of the boat built for E. R. Thomas, had imagined that the *Dixie* could be shipped from New York to Palm Beach in ten days, but he did not take into account the uncertainties of Southern transportation. The *Dixie* finally reached Jacksonville, but it never got to Palm Beach, and those who anticipated a royal battle between the two were forced to forego the pleasure.

The *Six Shooter*, equipped with a 75-horsepower Olds motor, and R. D. Chapin given as the owner, met with a mishap on the first day in the form of battery difficulties, and it had to be towed away. The next day a cylinder head gave way and placed it completely on the shelf for the week. One thing and another seemed to conspire in making it easier for the triumphant *Mercedes*.

A. D. Proctor Smith scored on Tuesday with *Simplex III*, of 30 horsepower, and later sold the craft to John C. King, who had been erroneously given as the owner of *Topsy*, which finished second to the *Simplex*.

The *Allon*, fitted with another 30-horsepower S. & M. motor, and owned by Tyler Morse, scored handily on the first day in a ten-mile race, and the following day again finished in front with a liberal allowance.

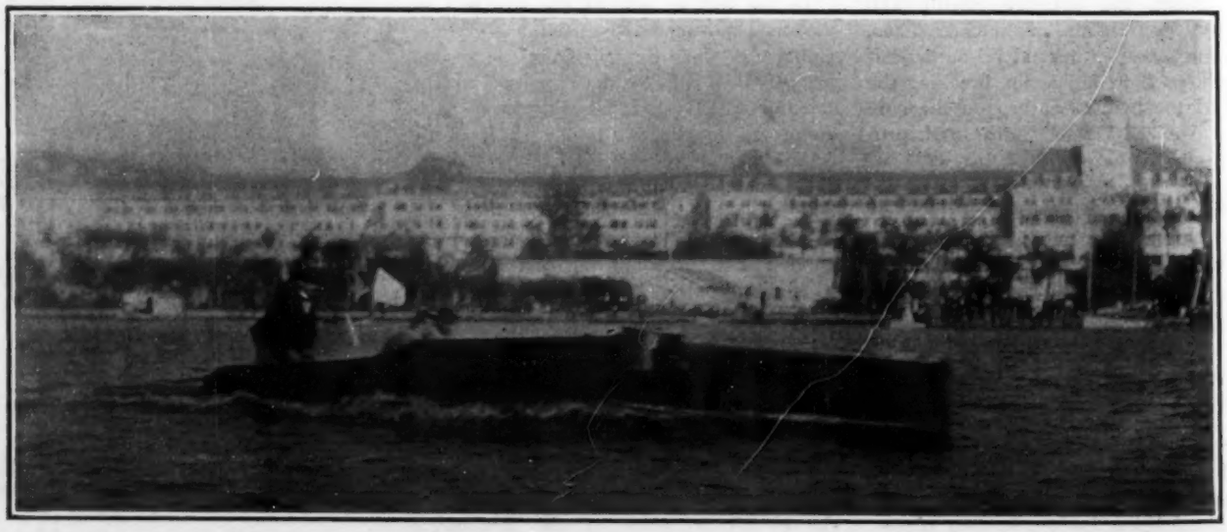
THOMAS DEWAR TROPHY SHIELD.

The *Carita*, with a 30-horsepower Continental motor, showed the way to the *Allon* in the afternoon ten-mile event with revised time allowances.

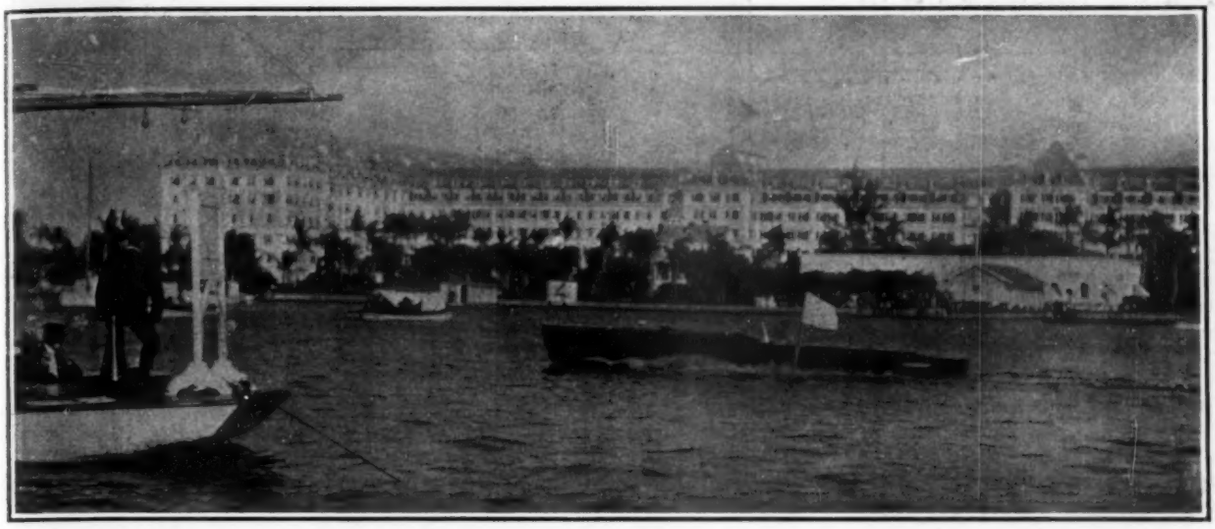
Taken as a whole, the regatta was rated a substantial success, and even now preparations for next year's gathering on Lake Worth are being considered. Commodore Frederick Sperry intends to make the Lake Worth affair the most important auto boating series in Southern waters.

Florida Meet in March.

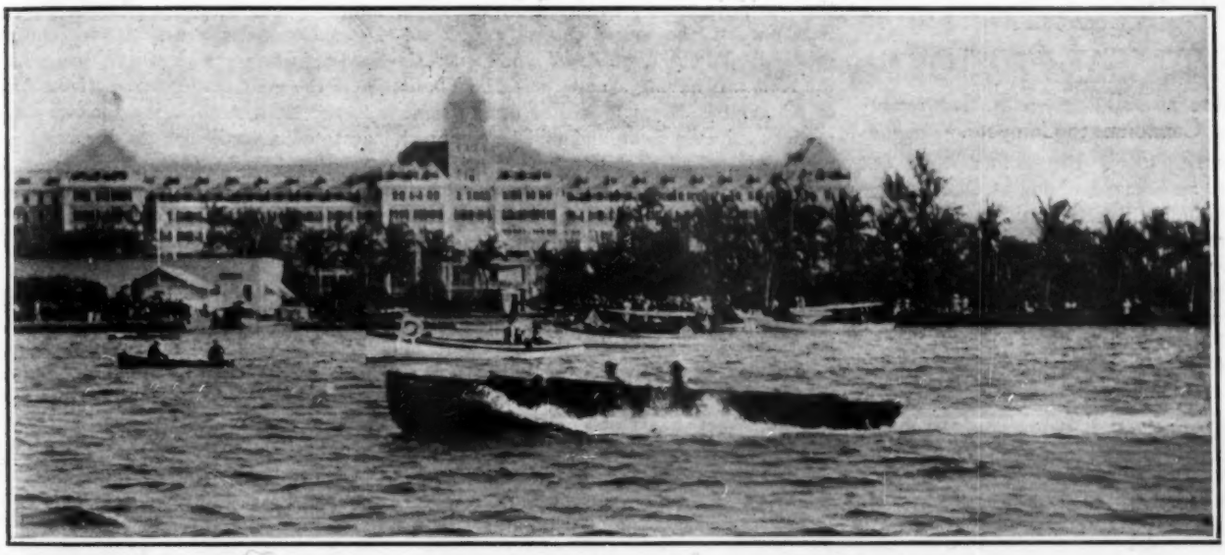
Although nothing definite has been decided upon, it is not unlikely that the 1907 meet of the famous Ormond-Daytona course will be held in March. The uncertain weather of January has caused this change of date to be seriously considered, and it



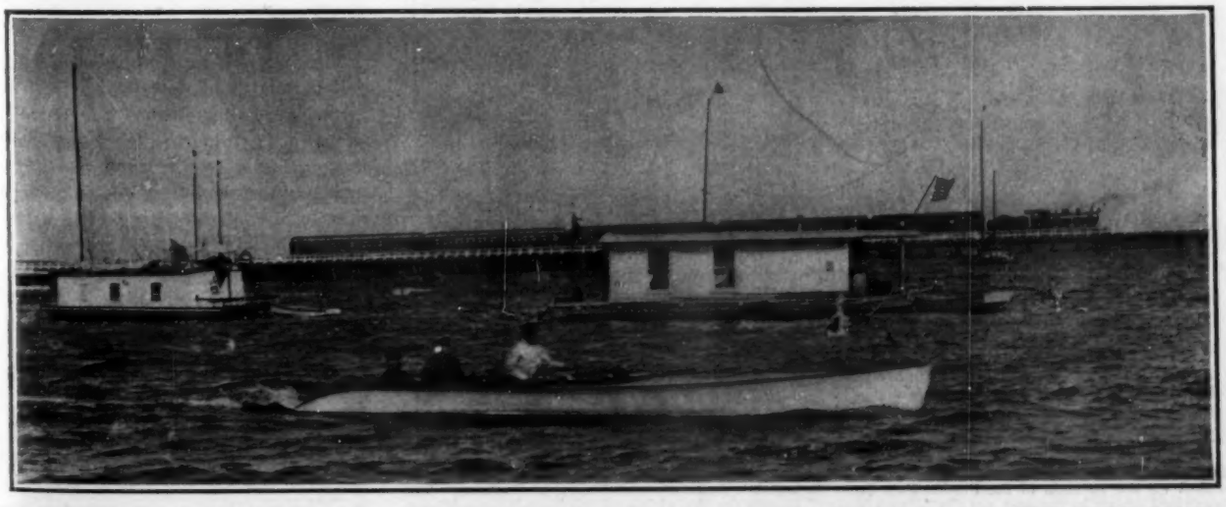
"MERCEDES U. S. A.," WINNER DEWAR TROPHY AT PALM BEACH REGATTA, WITH H. L. BOWDEN, THE OWNER, AT THE WHEEL.



A. D. PROCTOR SMITH'S "SIMPLEX III." PASSING STAKE BOAT IN LAKE WORTH IN FRONT OF ROYAL POINCIANNA HOTEL, PALM BEACH, DURING SECOND ANNUAL REGATTA LAST WEEK.



TYLER MORSE'S "ALLON," WINNER ON TWO DAYS IN THE PALM BEACH REGATTA, UNDER FULL SPEED.



GEORGE GINGRAS'S "23," WHICH RAN SECOND TO "MERCEDES" IN FOUR EVENTS ON THE FINAL DAY—NOTE HOUSE BOATS AND TRAIN IN BACKGROUND.

may be that the Cuban race will be the beginning of the Southern series instead of the Ormond-Daytona meet.

Henry M. Flagler, the railroad and hotel magnate of Florida, was an interested spectator at the January meet, and as a result of his observations there will be some decided improvements another year. Assurances from him make it a certainty that Ormond and Daytona will be connected by gasoline railroad, making the course easy of access no matter at which end of the beach the race takes place.

Weather conditions compel eleventh-hour revision of plans for the Florida meet, and often this has occasioned much inconvenience to the spectators, principally because of the lack of transportation to the scene of activities.

The Florida East Coast Automobile Association will probably re-elect Asa Paine to the presidency, which means that the Daytona part of the meet will receive careful attention and any crudities which may have interfered in January will not be repeated.

FILLING HIDDEN GASOLINE TANK IN BOW OF AUTO BOAT. AT PALM BEACH.

AUTO BOAT ACTIVITY.

New Racers Building on St. Lawrence. Canadians to Compete.

SYRACUSE, Feb. 5.—Unusual activity is reported in auto boat building at Ogdensburg and Alexandria Bay this winter, and prospects are good for a lively season on the St. Lawrence next summer. Everything is being sacrificed for speed, and racing will be the sole mission of most of the boats now building.

The *Standard*, owned by Captain Leighton, of this city, which for three years was undoubtedly the fastest boat of its class in the world, is being remodeled for the third time and will be equipped with a new engine. L. T. Hunt, of Brooklyn, owner of the *Roma*, is having a new racing boat built at Alexandria Bay. It will be of the same model as the *So Long* and will be equipped with a six-cylinder, 50-horsepower engine.

For several years Americans have had things their own way in the big auto boat championship races at Chippewa Bay and Alexandria Bay, but this season at least two fast Canadian boats will strive for some of the honors. C. T. Munroe, of Gananoque, has had a racing hull designed and built at Alexandria Bay in which he will install a Canadian type of automobile gas engine of high power, speeded to 1,000 revolutions per minute and turning a 28-inch, three-bucket propeller specially designed by Thorncroft.

The Chippewa Yacht Club, which has held the gold challenge cup of the American Power Boat Association for two years, has accepted a challenge for the cup from the Riverton Yacht Club of Riverton, N. Y. The races will take place at Chippewa Bay, Thousand Islands, in August.

GROUP OF HANDSOME TROPHIES COMPETED FOR AT THE FLORIDA TOURNAMENT.—Photographed on the veranda of the Florida East Coast Automobile Association clubhouse at Daytona. The wreath and crown in the case are the "Times Union" Trophy for the winner of the Two-Miles-a-Minute event, won by Demogeot; in S. B. Stevens' 200-Horsepower Darracq. The tall center trophy is the Minneapolis Cup.

ON WAY TO CUBAN RACES.

Among the passengers sailing from Miami, Florida, for Havana, on the 5th instant were Demogeot, Lancia and Cedrino, who took with them their racing cars for competition in the Cuban events. On the steamer with them were George P. Tangeman, Mr. and Mrs. S. M. Butler, Mr. and Mrs. Charles D. Cook and more than twenty circuit chasers and newspaper men.

Maurice Bernin is en route from New York on the steamer *Morro Castle* with a 90-horsepower Renault, and there is a strong probability that the big 30-horsepower Fiat racer belonging to Charles G. Gates will be entered in the big race.

The use of automobiles in rural free delivery work has received a fresh impetus through the decision of the postoffice department authorizing the employment of these vehicles by the carriers. For several months there had been considerable opposition in the department, it being the belief of the officials that the automobile had not yet reached a state of perfection which would warrant its substitution for the horse-drawn vehicle. Their dependability and economy has been so thoroughly demonstrated, however, that all opposition has been removed.

That the American car is steadily gaining in favor abroad may be evinced from the fact that at the recent show in Paris the Oldsmobile agent took orders for more than 350 cars.

TYPES OF AMERICAN SHOCK ABSORBERS.

INCREASE in the power and speed of automobiles has developed a need for some sort of device for deducing the effect of shocks to the springs and body of a car when moving rapidly over rough roads. Improvement in the quality of automobile springs has kept pace with the improvement of the cars themselves, and they are remarkably efficient in the matter of strength and elasticity; but the very elasticity that nullifies the greater part of the shock occasioned when a wheel passes suddenly over an obstruction causes a violent reflex action that thrusts the body upward, occasioning discomfort to the passengers and not infrequently breaking one or more leaves of the spring.

An automobile spring is composed of a number of leaves superimposed, with the shortest leaf resting on the spring block on the car axle and the longest at the top. In order that each leaf may contribute its individual flexibility, these leaves are not clamped together except at the middle, and they slide on one another as they play up and down. When the spring rebounds after it has been compressed by an upward thrust of the wheel, the tension of all the several leaves composing it exert simultaneous upward force. This is very powerful after a severe jolt and tosses the body upward, far past the normal position. As the body rises it carries with it the top leaf of the spring, which alone is attached to it at its two ends, and since the other leaves are not attached to the top one, the longest, and consequently the weakest leaf, alone resists the motion. Often its strength is exceeded under such conditions and it breaks.

To prevent such breakage, and also to overcome the violent rocking and pitching movements of a car body resulting from the lively play of the elastic springs when an automobile is driven rapidly over rough roads—as, for instance, in a road race, when the motion becomes positively dangerous—a number of so-called shock absorbers and suspensions have been invented and offered in the market. These are of a variety of types and they act in several different ways. Some are devised to resist the springs on the upward movement of the axle (or downward movement of the body) so that the rebound will not be violent; others offer resistance to both the upward and downward movement, and still others present no resistance when the spring is compressed, but on the rebound exert a restraining pull as the axle and side frame of the car move away from each other.

Before shock absorbers made their appearance and became popular, it was a very common practice to attach straps to the frame of the car and pass them under the axles at either end, leaving slack enough in the loops to permit all desirable play of the springs but making them short enough to stop excessive upward thrust. Another method adopted by French racing men has been to wind the springs tightly with stout cord so as to bind all the leaves together, thus permitting all the leaves to resist the upward thrust. Within the last year or two the extra long springs have been made with ears

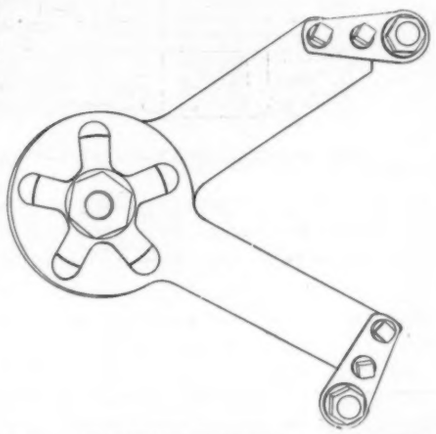


FIG. 1.—HARTFORD FRICTIONAL SUSPENSION.

at the ends of the second longest leaf turned up over the top leaf, so as to hold the two leaves together.

Herewith are illustration and descriptions of eight shock-absorbing devices, most of which have only lately been placed in the market. It will be seen that most of them operate through frictional resistance, but that others are pneumatic and one is hydraulic.

Hartford Friction Suspension.

The first American shock absorber to make its appearance was the Truffault-Hartford, which was introduced about three years ago and was made by E. V. Hartford after the design of the French Truffault suspension. It consisted of two steel arms pivoted together at one end and having attached to their outer ends short steel arms to be bolted one to the side frame of the car directly above the axle and the other to the spring block or axle below. At their pivoted ends the arms were enlarged into disks and carried between them a leather friction washer. A screw bolt passing through the centers of the disks and washer held the parts together and regulated the amount of friction generated as the plates rotated relatively on the bolt. When attached to the car, the arms normally maintained a position at slightly less than right angle to each other. When the car passed over an obstruction and the wheel was forced upward, carrying the axle with it, the shock absorber resisted the movement in just the degree of the friction developed at the joint. On the rebound of the spring, tending to pitch the frame and body into the air, the same friction absorbed the reaction as the arms slowly returned to their normal position.

This device proved very successful and quickly became popular, for without impairing the flexibility of the springs they made the action slower and prevented the unpleasant pitching about of the body, and also the breakage of the springs. A number of improvements upon the original Truffault suspension have been made during the past two years by the Hartford Suspension Company, of New York, which has brought out a new style of the Hartford shock absorber for the coming season. This is shown in the accompanying illustration (Fig. 1) and is designated Model H. It has the great advantage that it is self-adjusting for wear and needs no readjustment of tension after leaving the factory, where each set of suspensions is adjusted and tested to a uniform tension.

The tension is maintained by means of a large spring steel spider held tightly against the outer face of one arm by a central adjusting bolt which passes through the disks and carries a nut on the other side. The spring tension of the radiating arms of this spider automatically compensates for all wear. The central stud is bushed with hardened steel and is provided with an improved locking means that avoids the use of check nuts. The friction disks are of leather. The arms are of spring steel and the small arms at their ends are secured rigidly to them, resulting in a straight, up-and-down movement instead of the shearing motion of the older styles of absorber. The new device is also easier to attach to the car.

Diezemann Friction Device.

A shock absorber involving the same principle of frictional resistance is made by

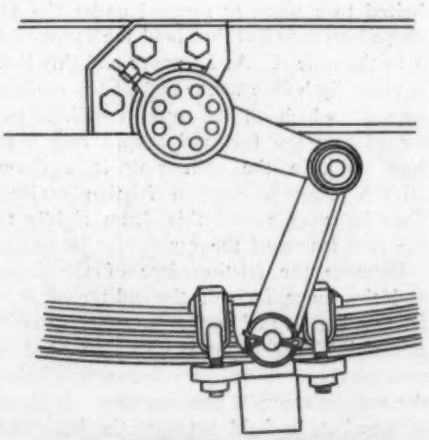


FIG. 2.—DIEZEMANN FRICTION DEVICE.

the Diezemann Shock Absorber Company, of Hoboken, N. J. As shown in Fig. 2, this has a plate bolted to the side frame of the car and a metal arm or connecting link pivotally secured to the spring holder above the axle. The plate on the side frame carries a bronze casing containing plates and fiber friction disks and a friction spindle. Tension on the friction disks is maintained by a central adjustment screw, which is held against loosening by a copper-seated locking device. The friction spindle with its plates is secured to one end of a lever arm whose outer end is pivoted to the upper end of the vertical link previously mentioned. The joint is held by a taper stud working in a fiber bushing. The action of the device is essentially the same as that of the Hartford suspension. The friction surfaces are enclosed in a dirt-proof and air-tight case and are packed in grease, a feature contributing to perfect action and long life.

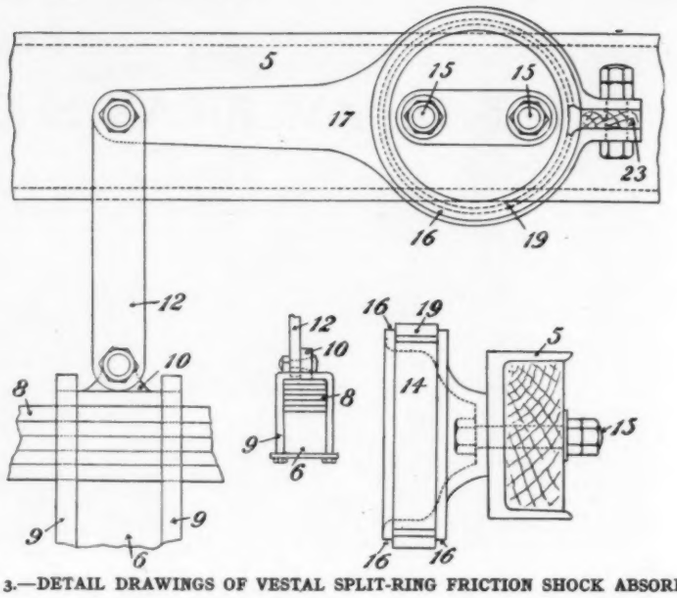


FIG. 3.—DETAIL DRAWINGS OF VESTAL SPLIT-RING FRICTION SHOCK ABSORBER.

Vestal Friction Ring Device.

A modification of the foregoing type of friction suspensions is a very simple form invented and patented by Oscar E. Vestal, of Pittsburg, and now just being placed in the market. As the accompanying drawings in Fig. 3 show, this has a link *12* movably bolted to a plate *10* secured under the U-shaped spring clips that hold the car spring *8* to the axle *6*. At its upper end this link is pivotally bolted to the end of the rocking arm *17*, which, at its opposite end, is enlarged into the form of a split ring with lugs Within the split ring is a drum with a flange *16* and a friction surface. Two bolts *15* secure this drum rigidly to the side frame of the car.

Between the friction face of the drum and the inner face of the split ring is a friction band *19* of leather or other suitable material. Tension on the friction band is maintained by means of a bolt which holds the ends of the split ring together. A block of wood *23* is held between the lugs and may be compressed or replaced by a thinner piece when it becomes necessary to take up wear in the friction band and surfaces. The operation is, of course, obvious, the friction faces resisting action of the spring in both directions.

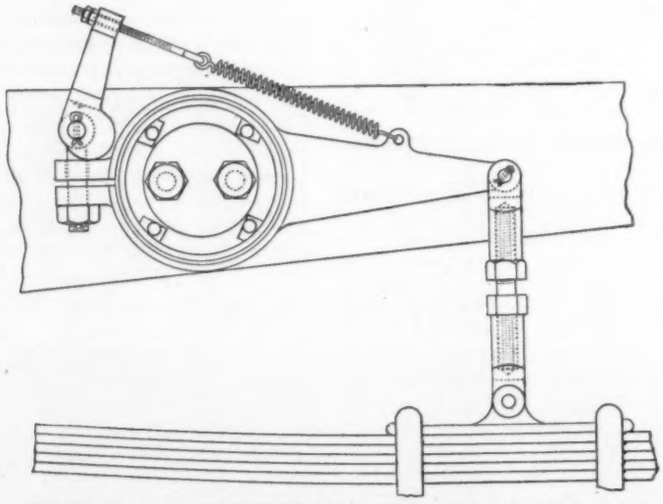


FIG. 4.—KELSEY ROLLER CLUTCH FRICTION DEVICE FOR RESISTING REBOUND.

Kelsey Roller-Clutch Absorber.

The newest of the shock absorbers designed to offer no resistance to the car spring as it is forced upward, but to prevent the sudden rebound that is so liable to cause the leaves to snap, has been invented and patented recently by C. W. Kelsey, formerly of Philadelphia, but now of Tarrytown, N. Y. The device is illustrated in Fig. 4.

To the side frame of the car is secured by two bolts a circular plate having four cam slots in the periphery. Rollers are inserted in these slots, and bearing on the rollers is a spring steel friction ring split on one side to permit expansion. Between the outer face of this ring and the inner surface of an enclosing ring is a fiber friction band. The exterior ring is split on one side and on the opposite side has a tapered arm which is pivotally connected to the upper end of a link that is in turn pivoted at its lower end to a plate held by the spring clamps of the car.

When the axle and its spring are forced up, the taper arm of the shock absorber rises and the ring at its end is rotated counter-clockwise upon the circular plate attached to the frame. When this movement occurs there is no wedging action in the roller clutch and the spring acts without resistance; but when the rebound occurs and draws the arm down, the rollers are drawn into the small ends of the cam slots and cause the internal split ring to expand within the external ring and set up a frictional resistance.

The amount of friction predetermined by the tension of the coil spring acting on the cam lever pivoted to the head of a bolt which is free in the upper lug of the split external ring. The constant pull of this spring tends to force the ends of the split ring together and bind the ring on the internal friction band. Adjustments are effected by the lock-nut on the end of the

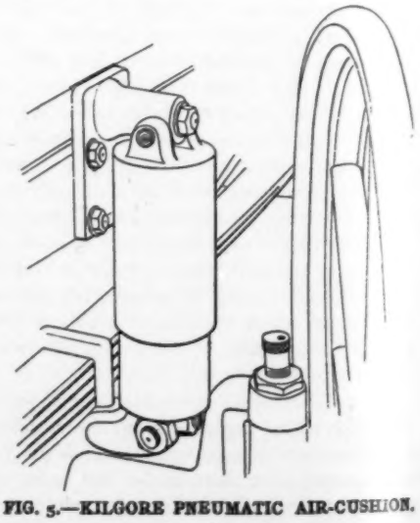


FIG. 5.—KILGORE PNEUMATIC AIR-CUSHION.

eye-bolt and by the right-and-left threaded bolt in the link attached to the car spring.

Kilgore Dash-Pot.

Quite a different type of shock absorber from those already described is made by the Kilgore Automobile Air Cushion Company, of Buffalo, N. Y. It consists of a small metal cylinder which is attached to the axle and a piston attached to the frame and working air tight in the cylinder (Fig. 5). Suitable brackets with universal joints are provided for making the connections, so as to permit relative movement in all directions. The stem of the piston or plunger is attached to a casing which fits over the cylinder and excludes dust and dirt. There is no valve in the piston, the elasticity of the inclosed air at either end of the plunger being depended upon to cushion the shock when especially severe jolts compress the spring of the car. The rebound of the spring is also cushioned in the same manner. Sufficient lubricant is inserted in

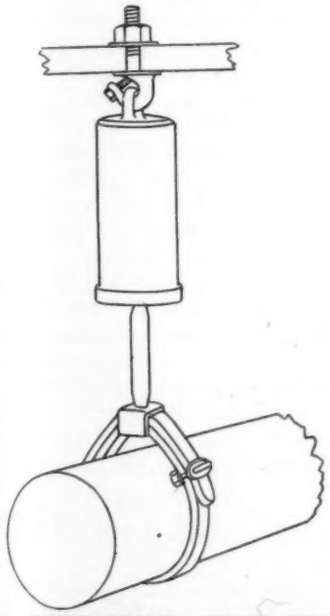


FIG. 6.—HOUSE RECOIL CHECK, UTILIZING FRICTIONAL RESISTANCE ON REBOUND.

the cylinder to last, it is claimed, for 1,000 miles of driving.

House Recoil Check.

A new device having the form of the air-cushion absorber but utilizing the friction principle is the recoil check invented by H. A. House and now offered in the market by the Baldwin Chain and Manufacturing Company, of Worcester, Mass. This has a cylinder hung from the frame or floor of the car by a hook and eye just above the car axle, as in Fig. 6. Working in this cylinder is a piston divided diametrically and covered with oil-soaked leather to contact with the sides of the cylinder. A rod sliding in the cap of the cylinder is strapped to the axle, and at its upper end is connected to a yoke, to which are attached a set of toggle arms. The ends of the toggle arms abut against the two halves of the divided piston.

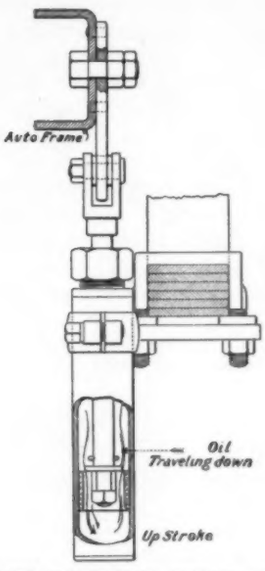


FIG. 7.—FOSTER HYDRAULIC RECOIL CHECK.

Springs in the cylinder normally hold the halves of the piston depressed out of contact with the walls of the cylinder, so that when the axle is forced upward the piston offers no resistance to the motion. But when the spring jerks back, the pull on the plunger stem forces the toggle arms outward and causes the piston to spread out into circular form instead of the normal oval shape, so that the edge contacts forcibly with the walls of the cylinder all around, and the friction cushions the rebound. When the sudden jerk is relieved the valve assumes its normal open position again, ready to check the next jolt.

The construction of the valve and toggle and the tension of the inclosed spring are such that the check offers no resistance to the proper gentle play of the car springs, but acts promptly to check violent action, its resistance increasing as the square of the velocity.

Foster Hydraulic Check.

The principle of hydraulic action is employed in the shock absorber invented and recently placed on the market by the Gabriel Horn Manufacturing Company, of Cleveland, Ohio. As shown in the engraving (Fig. 7), this has a small, light cylinder made of cold drawn steel which is secured to the axle and depends below the spring. Sliding in a guide nut that closes the top of this cylinder is a plunger rod connected to the side frame of the car by means of a bolt. At the lower end of the plunger rod is a head having two small valves. The bottom of the cylinder is filled with oil.

Sudden compression of the springs forces the plunger down against the oil and the oil is forced quickly through the valves to the upper side of the plunger. When the recoil occurs the oil in the upper chamber acts as a cushion and the plunger retards the spring action with a slow, steady pull that prevents the jar and shock occasioned by a bump encountered at high speed, the oil flowing back slowly to the lower chamber in readiness for the next jolt. The device is adjustable in every direction and can be placed on any car. It is built substantially and weighs 2 1-2 pounds.

Sheddan Pneumatic Cushion.

Air inclosed within a cylinder is the cushioning agent depended upon by the Sheddan Manufacturing Company, of Baltimore, Md., in its Perfection air cushion which is being offered to automobilists. While this device has the same general appearance as the Foster absorber, the position of the parts is reversed, the cylinder being attached to the side frame, as shown in Fig. 8, and the plunger rod to the spring and axle. The pneumatic cushions above and below the piston absorb the shocks in both directions, like the Kilgore device, reducing the effect of the severer shocks due to high speed on rough roads. The device is adjustable to any depth of springs by means of the bracket sleeve which is bolted to the side frame of the car.

Edo Spring Compensator.

The shock absorbed offered by the Edo Spring Compensator Company, of New York, consists of a worm-geared rod, having at one end a small cone with a washer of leather interposed between its face and a metal surface to provide a braking effort when the rod is revolved in the reaction of the springs. This rod passes through a suitably threaded box attached to the axle of the car, a grease cup fitted to the box providing proper lubrication for the worm rod and the threaded guide. The mechanism is protected from dust and dirt by a corrugated leather jacket which extends to the lower end of the rod and between the two cylindrical boxes on the axle and frame. The cylindrical box attached to the frame is so designed internally that the

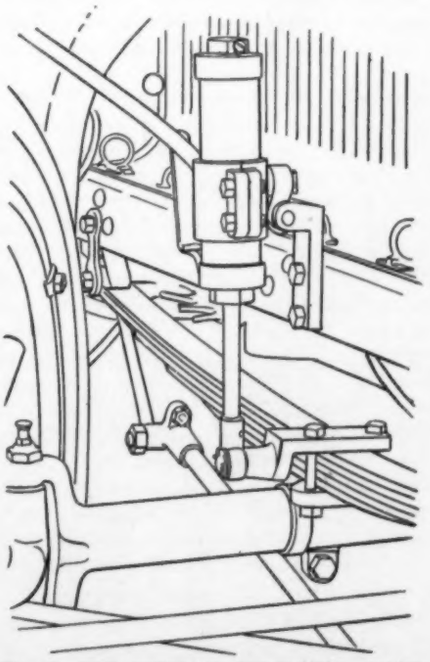
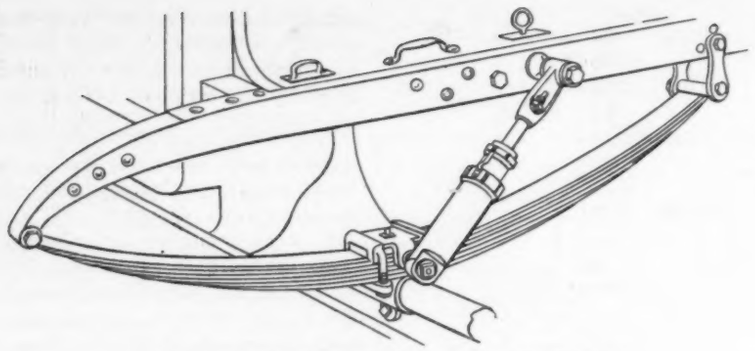


FIG. 8.—THE SHEDDAN PNEUMATIC SHOCK ABSORBER.



IG. 9.—AMERICAN HYDRAULIC SHOCK ABSORBER.

worm rod has a free bearing when the springs are compressed, the cone clutch being brought into action only when the reaction occurs, and in proportion to the severity of the rebound. Both boxes are attached to the car with universal joints so that side swing of the frame on rough roads will not interfere with the free action of the device. The retarding effect is gradually decreased as the springs assume the normal position and the absorber is claimed to act without causing the slightest diminution of the sensitive action of the springs in compression.

Hotchkin Anti-Jolt Device.

A shock absorber devised on the hydraulic principle with one-way action is marketed by P. M. Hotchkin, of Chicago. The circular case containing the simple mechanism may be bolted either to the axle or to the frame, see Fig. 11, showing the latter method of attachment.

The mechanism inside the case consists of a central shaft to which is attached a wing or paddle that forces the contained liquid, glycerine, ahead of it in either direction as the paddle is carried around by the action of a reciprocating arm which is attached to the frame by means of a hinged link and a stud. The one-way action is obtained by the use of a check valve fitted to one side of the case, the glycerine passing freely through the open valve when the revolution is caused in the direction of spring compression and the check valve decreasing the size of the passage when the direction is reversed and the axle and frame are moving apart. By thus restricting the passage for the liquid the rebound or pitching of the body is prevented.

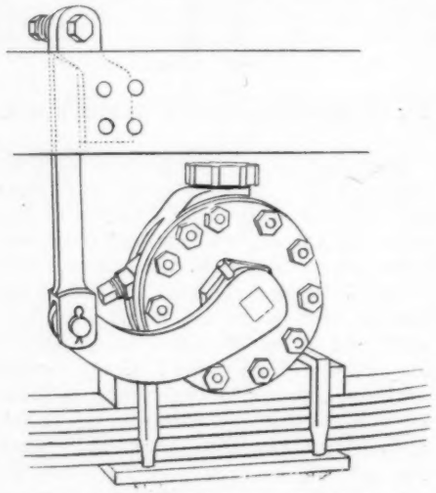


FIG. 11.—HOTCHKIN SHOCK ELIMINATOR.

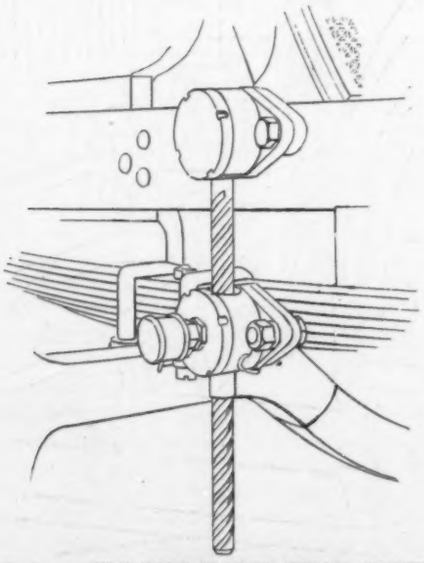


FIG. 10.—EDO CONE CLUTCH CHECK, ACTING ONLY ON REBOUND OF SPRINGS.

Sager Equalizing Spring.

The J. H. Sager Company, of Rochester, N. Y., manufactures a spring designed to contribute to the easy riding qualities of a car, acting as a shock absorber when applied as illustrated in Fig. 12. This device is really a supplemental spring, acting in both directions and is so designed that the small coils at the ends of the spring will come into action after compression or extension of the larger diameter, mid-section has been accomplished.

There are no moving parts to compensate for side swing, the flexibility of the spring taking care of any lateral motion of the car frame when driving at high rates of speed or over rough roads. Among the advantages of the Sager spring is the low cost, simplicity and ease of attachment.

American Shock Absorber.

A two-way hydraulic check is made by the American Shock Absorber Company, Easton, Pa., which is designed for attachment at an angle of 45 degrees from the vertical. This method of attachment is claimed to not only admit of the use of a shorter cylinder and piston but to contribute materially to the good results of spring control. (See Fig. 9.)

The barrel is made of cast bronze, in one piece, with the eye for attachment to the axle formed in an integral extension at the bottom of the closed cylinder. The open upper end is threaded to receive the cover cap, which is provided with a threaded extension to carry the stuffing box and retaining cap and a locking ring. The piston is machined from a solid bar, the rod being integral and threaded at its upper extremity for the attachment of the eye which takes a stud, riveted or bolted to the frame of the car.

The device is dependent for its action on the travel of the piston up and down the cylinder through a body of oil, the oil finding a passage through the piston by way of an adjustable valve. The valve is adjustable by means of a threaded steel rod of small diameter extending through the piston rod and terminating in a square head with suitable lock nut for securing it in position, the adjustment being necessary only when the shock absorbers are first fitted to a car. This feature admits of the use of but one model for light, medium and heavy cars.

The check is placed with the pistons of the front pair inclining toward the rear and the pair for the rear axle are inclined

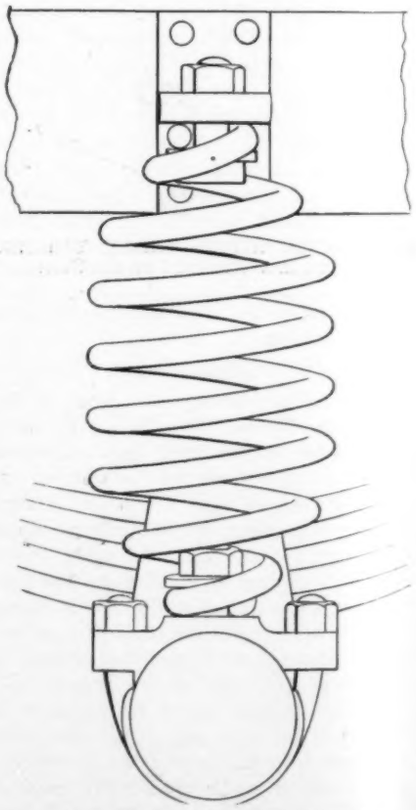


FIG. 12.—SAGER EQUALIZING SPRING.

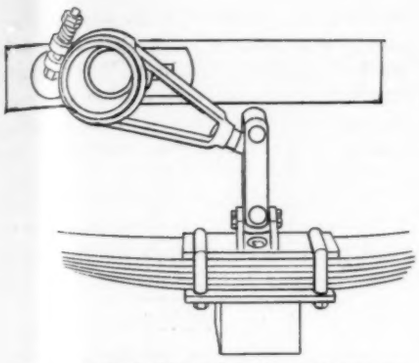


FIG. 13.—GODSHALK UNIVERSAL SHOCK ABSORBER.

forward. In order to provide for lateral motion of the frame the attaching eyes are countersunk with a decided taper and cup-shaped caps are fitted to retain conical rubber washers in contact with the studs on the frame and axle.

GODSHALK UNIVERSAL SHOCK ABSORBER.

A shock absorber depending on frictional resistance is made by E. H. Godshalk & Company, of Philadelphia. A friction drum is attached to the frame of the car with a steel spring collar, a band of oak tanned leather being interposed to provide a gripping surface. The arm of the spring constricting member is attached to a link by means of a universal joint, a second universal joint being located at the lower extremity of the link to provide free motion to the device when the frame of the car is thrown out of alignment with the wheels on rough roads.

The friction drum is self-adjusting to the required amount of tension and exerts a retarding effect both under compression and rebound of the springs of the car.

Road Waterproofing Process.

KANSAS CITY, Feb. 3.—It is universally admitted that the most perfect road for the greatest variety of uses is a dirt road, packed solid enough to do away with most of the dust and yet having enough resiliency to make traveling easy for animal and vehicle. In a number of places in Kansas, notably in the vicinity of the State Agricultural College, this idea has been developed and frequent experiments have been made with roads treated by oil under several different processes.

The most successful tests along this line, however, have been made in Kansas City by a local concern, the Imperial Roadway Company. One piece of pavement laid by this company on Fortieth street between Troost and Harrison streets, has seen the hardest kind of service for three years and has outlasted the roadway adjoining it on both sides. Another piece has been down since last summer and is giving much better satisfaction than a strip of asphalt adjoining it. Neither the heat of the summer nor the frosts of the winter has affected the pavement, and constant travel over it has given ample opportunity for observing the results of heavy traffic.

The cost of this new pavement is less than that of good macadam, while its wearing qualities are said, and appear, to be better. The pavement is simply a waterproofed dirt road—nothing more.

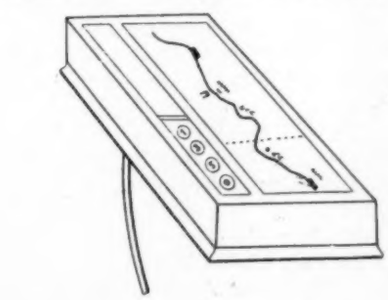
While the Imperial Pavement is laid under a secret and patented process, enough is known to give a fair idea of it. To begin with, the road is graded to the level which it is to have when finished. The earth is then harrowed fine to a depth of several inches and saturated with a patented mixture, of which crude oil is the principal constituent. This treatment is kept up until all the harrowed earth is a sticky, oily mass, thoroughly impregnated with the oil.

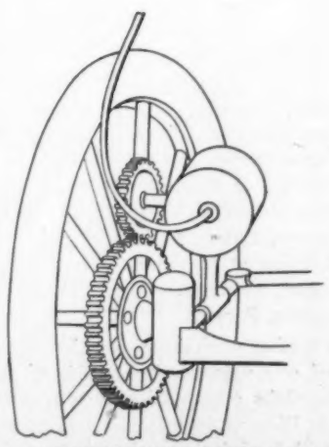
After that the whole mass is rolled hard. A little cement is applied to the top to give a light color, as otherwise the pavement would be black. The surface, after the rolling has been finished, is not smooth like asphalt. It looks as if a very thin layer of sand had been sprinkled upon it, and there is never a time when an automobile tire cannot get traction on this surface.

A piece of country road ten miles long is under contract and probably will be laid in the spring. The cost is seventy-five cents a square yard to the property owners, as against $2.50 for asphalt. The road has been seen and approved by some of the most prominent good roads advocates in the United States.

Another unusual feature of the "waterproofed" road is that it does not get muddy, even if soil is tracked on it by wagon wheels. Why this is so is yet to be explained, but muddy weather tests have proved the truth of the statement.

So widespread is the interest in the new process that a number of agencies for different states have been placed, some of the territory assigned being east of the Mississippi river. The prospects are that a good deal of such pavement will be laid before next winter. One valuable feature, so far as country roads are concerned, is that no plant is necessary for the preparation of the material, thus reducing the required capital to a minimum.





AUTOMATICALLY UNFOLDED MAP.

Novel Auto Map.

A new automobile map has been brought out in Paris which will constantly indicate to the driver his position on the road and will roll out before him automatically in proportion to his speed. The apparatus consists of a glass-top box about 8 inches long and 3 inches wide attached to the top of the dash. On the right-hand side is exposed a strip map of the road supported on a roller at each extremity and made to unroll at a rate proportionate to the speed of the car, but always in such a way that 5 miles of the road ahead can be seen. On the left-hand side of the road map is a narrow strip giving an explanation of all the signs shown on the map. At a speed of 37 miles an hour every obstacle or change in the nature of the road is known 8 minutes before it is reached. At 74 miles an hour, the same would be indicated 4 minutes in advance. The map is made to unroll by means of gearing on the front wheel of the car, imparting motion to a gear on the chart box by means of a flexible cable exactly as is used for speedometers. When passing through towns the map indicates, left, right, so that it is possible to go right through without stopping to ask directions.

Akron, Ohio, famous for its automobile tire factories, has 165 licensed automobiles, but with all of its great output of tires, it has no automobile factory. The ordinance requiring the licensing of automobiles went into effect in June, 1903, and the first license was taken out by Chief of Police Durkin for the auto police patrol, said to be the first of its kind in the United States, and which is still in use. Since the licensing of automobiles began, two women have been authorized to operate machines. In 1905 seventy automobiles were sold in Akron, and dealers predict a much larger sale this year. Most of the machines which have already been purchased, or will be purchased during the next two weeks, will be on exhibition at the Cleveland show from February 16 to 24, and then be delivered later.

The present winter (?) has been a very poor one for demonstrating the practicability of suggestions given for the handling of automobiles in cold weather.

Advance Work for the Grand Prix.

PARIS, Jan. 22.—The authorities in the Sarthe district, through which the French Grand Prix will be run, are enthusiastic over the great race, and their aid is assured. A local automobile club has just been formed which will give valuable assistance to the Automobile Club of France. Among the rural inhabitants there is a very friendly feeling toward automobilism, despite an unfortunate habit that the country people have of allowing their cattle and fowl to stray on the road, neglecting to light their lanterns and ignoring the rules of the road. In order that the entire population may be made acquainted with the importance of the race, a local committee, acting in conjunction with the Automobile Club of France, has arranged to give lectures in every village on the Sarthe circuit on automobilism in general and the big race in particular.

Cinematograph pictures of the last Gordon Bennett race will be shown, the national importance of the automobile industry will be dealt with, the advantages to be derived from automobile transport services in country districts will be pointed out, the immediate financial gain to the neighborhood, and instructions to drivers and farmers on how to act when meeting an automobile will also be given.

As most of these villages are excessively dull in winter, a free moving-picture exhibition and lecture will be quite an event; it is thus reasonable to presume that all the little prejudices on the part of country folk against automobilists will be removed in advance, and that when the racing teams arrive on the spot they will find an enthusiastic population to greet them.

Work on the circuit will not be commenced until winter is quite over. Very few changes have to be made, the road being already in such perfect condition. The erection of grandstands and the making of two loop roads will be quickly accomplished when fine weather arrives. A meeting of the Sporting Commission will be held in a few days, when it is expected that the exact date of the race will be fixed.

In addition to Fiat, Itala and Isotta Fraschini cars, already announced as representing Italy in the Grand Prix, two other Italian firms have declared their intention of starting in the race. They are Zust and the new firm, F. L. A. G. (Fabrica Ligure Automobili Genova). Raggio, the winner of the Florio Cup last year, will drive the F. L. A. G. racer.

Three 120-horsepower Zust machines are now under construction. They will have four cylinders, four speeds and reverse with direct drive on the high, and on the high speed the road wheels will make the same number of revolutions per minute as the motor flywheel.

The Mors concern has officially declared that it will not take part in the race. Two new French firms which have not hitherto competed in big road races, but which have created a very favorable impression in tourist competitions, have decided to build racers. They are Vulpes, with two machines, one of which will be driven by Barriaux, and Grégoire, also with two machines.

European Circuit Plans.

PARIS, Jan. 26.—Some important modifications have been made in the regulations governing the 3,100-mile touring test through Europe this year. For every stop during the run one penalty point will be counted for each minute; stops for tire troubles will not be penalized. In order to limit the speed of machines, the running time of each competitor will be augmented by the total penalized stops and non-penalized stops for tire repairs. In addition one penalty point per minute will be imposed for failure to keep up to the minimum speed indicated for each category.

A map of the entire circuit and list of regulations will be drawn up in the French language and given to each competitor; but should they wish to do so, foreign clubs whose territory is passed through may issue special maps of their own portion of the circuit. Every competitor finishing the tour will be presented with a diploma in the names of the Automobile Clubs of France, Germany, Austria, Belgium and Italy.

Twenty-one days will be occupied by the European tour, six of them being given up to exhibitors in the principal centers passed through. Following is the complete list of towns passed through, together with dates:

July.

29. Paris, Limoges.
30. Limoges, Toulouse.
31. Exhibition at Toulouse.

August.

1. Toulouse, Le Puy.
2. Le Puy, Aix-les-Bains.
3. Exhibition at Aix-les-Bains.
4. Aix-les-Bains, Milan.
5. Exhibition at Milan.
6. Milan, Trieste.
7. Trieste, Klagenfurth.
8. Klagenfurth, Vienna.
9. Exhibition at Vienna.
10. Vienna, Prague.
11. Prague, Breslau.
12. Breslau, Berlin.
13. Exhibition at Berlin.
14. Berlin, Hanover.
15. Hanover, Cologne.
16. Exhibition at Cologne.
17. Cologne, Mezières.
18. Mezières, Paris.

The executive committee for this event consists of one member from each of the automobile clubs engaged in the tour, with Marquis de Dion as president. Local organizations will be left to each of the clubs through whose country the competitors have to pass. Entries for the tour can be made to any national automobile club, and must be given in by April 15, after which date double entrance fees will be charged.

The number of starters has been fixed at 130; should this number be exceeded, the executive committee will annul a sufficient number of engagements to reduce the total to 130, beginning with the entries last received. Entrance fees will, of course, be refunded in full.

EXPORTS AND IMPORTS IN 1905.

The official record of our trade in automobiles and parts with foreign countries during the year just closed has just been published. It shows a remarkable growth of American exports, which have increased from $1,643,029 in 1903 and $1,897,510 in 1904 to $2,695,655 in 1905.

As compared with these figures the imports of automobiles and parts for last year aggregated $2,002,459, of which amount $1,866,402 represents the value of the 496 machines imported. During the month of December last forty-five cars, valued at $169,376, were brought in and $29,730 worth of parts were admitted.

Following is the record of exports from the United States by countries for December, 1905, and for the twelve months ending with December:

Exported to—	Dec., 1905.	Twelve Mos. Ending Dec., 1905.
United Kingdom	$ 75,258	$ 707,045
France	7,645	269,703
Germany	1,651	105,457
Italy	4,073	163,978
Other Europe	1,477	239,379
British North America	23,827	537,588
Mexico	29,672	192,452
West Indies and Bermuda	20,498	151,859
South America	5,507	61,419
British East Indies	696	31,793
British Australasia	8,964	120,083
Other Asia and Oceania	2,699	63,577
Africa	5,760	39,288
Other countries	8,918	12,034
Total	$196,645	$2,695,655

England will be well represented at the Monaco auto boat races next April, five of the fourteen entries in the eight to twelve meter class being British; namely, *Yarrow Napier*, entered by S. F. Edge; Siola, entered by Lionel de Rothschild (Napier engine); *Brooke I*, entered by Mawdeslay Brooke (Brooke engine); *Hutton II*, entered by J. E Hutton (Hutton engine); *Hutton-Saunders*, entered by A. Cunliffe (Mercedes engine). In the cruising division Miall Green starts his successful *Takumono* in the 61-2 meter class, and Mr. Gorham his *Quicksilver*, a Daimler-engined hull, in the 8 to 12 meters.

It seems impossible to make some people understand that the driver of an automobile actually dislikes running down a pedestrian, a dog, or even a hen.

MAGNIFICENT STRAIGHT STRETCH APPROACHING SCEAUX BY THE HUISNE RIVER, ON THE NORTH LEG OF THE COURSE.

TURN NEAR MANS AT WEST ANGLE OF COURSE LOOKING IN THE DIRECTION OF SAINT CALAIS, AT THE EAST ANGLE.

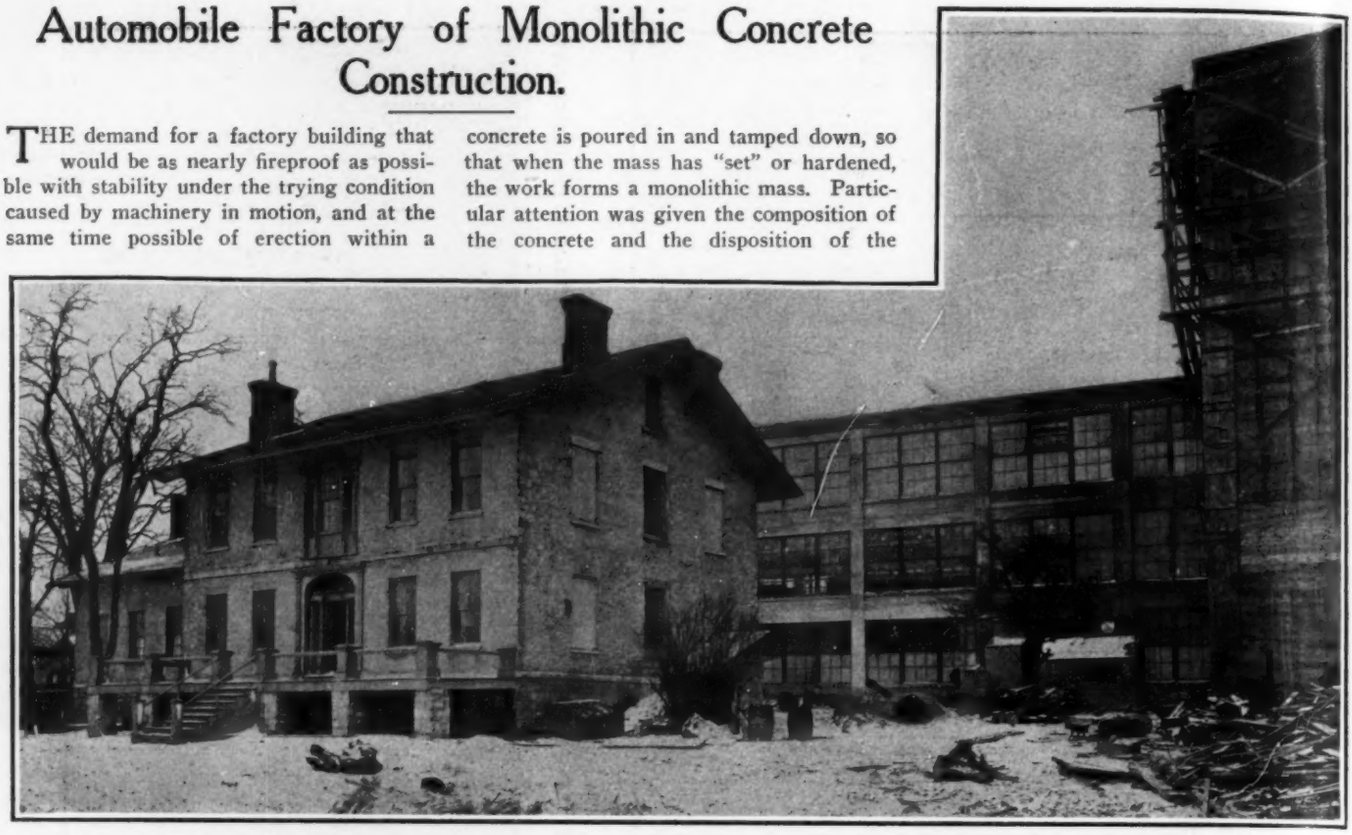
DANGEROUS TURN IN CONNERRE ON NORTH LEG OF THE TRIANGLE, SHOWING NARROW STREETS AND RISING GRADE.

FINE SWEEP OF EMBANKED ROAD CURVING IN THE DIRECTION OF ARDENAY ON SOUTH LEG OF THE COURSE.

CHARACTERISTIC VIEWS OF THE NEW COURSE JUST SELECTED FOR THE FRENCH GRAND PRIX AUTOMOBILE RACE, NEAR LE MANS, IN THE DEPARTMENT OF SARTHE, FRANCE

Automobile Factory of Monolithic Concrete Construction.

THE demand for a factory building that would be as nearly fireproof as possible with stability under the trying condition caused by machinery in motion, and at the same time possible of erection within a brief time, led to the adoption of cement construction of the new buildings now almost completed for the E. R. Thomas Motor Co., of Buffalo.



FRONT VIEW OF NEW THOMAS AUTOMOBILE FACTORY IN BUFFALO, SHOWING BOARD MOLD ON TOWER AT RIGHT FOR FORMING CONCRETE WALLS AND HISTORIC OLD MANSION IN CENTER REMODELED INSIDE FOR USE AS AN OFFICE.

Although the form of concrete construction followed by the builders is well known in railroad practice, bridge and viaduct abutments being now generally built of concrete on this plan, the use of this material for an automobile factory is a novelty in America. Instead of erecting a steel framework to support the side walls, roof, and contents of the building, steel has been used only as supplementary to the concrete, the walls, floors, beams, and other members of the structure being virtually one solid piece, stiffened with imbedded metal tie-rods. The resultant work is practically a one-piece building with stiff and unyielding floors, insensible to the vibrations common to wood floors of even the heaviest construction. No wood is used in the construction except for the window and door sashes, and the wooden supports for the shafting, which are bolted directly to the iron rods buried in the concrete at the time the building was erected. A few other small strips of wood are used as supports for the electric light wiring, but wood has been uniformly displaced wherever possible throughout the plant.

The method of building up the side walls is clearly indicated in the view of the water tower, partially finished when the photograph was made. Boards and scantlings are erected in the form of a mold, and the concrete is poured in and tamped down, so that when the mass has "set" or hardened, the work forms a monolithic mass. Particular attention was given the composition of the concrete and the disposition of the tie-rods, so that the building will withstand the tensile strains incident to the use of heavy machinery.

The new plant is shaped like an irregular L. One wing is 190 feet long and the other is 195 feet, with a width of 50 feet each. There are three stories and a basement, with a five-story water tower at an angle of the wings. The tower will have sufficient water capacity to supply the building and a complete equipment of automatic sprinklers and other emergency fire protection.

In planning the structure, particularly ample window spaces were provided, so that an abundance of light is available for the various operations of automobile construction. In all there are 496 windows, with more than 16,000 square feet of glass, which, with the white interior walls, should afford exceptionally fine light throughout the plant.

The building is so arranged that from the machining room the component parts of cars are carried direct to and about the assembling department by traveling cranes. The track for the cranes is shown in the illustration of the interior of the factory, and this overhead "trolley" will greatly facilitate the handling of all heavy parts. After assembly the motors and transmissions are carried by a traveling crane to the main assembling room, where the chassis construction is completed. The road tests are made before the bodies are fitted, and when this important work has been satisfactorily performed the chassis are taken by elevator to the second floor to receive the finished body and the final touches before shipment. The body finishing department is located on the third floor, which with its abundance of light affords opportunity for the most careful work and the closest inspection.

The entire available factory space is not yet in use, but when fully taken up will provide a capacity of no less than 1,200 standard Thomas touring cars a year.

The executive offices of the company are located in the historical residence building shown in the exterior view. This interesting old mansion was erected in 1816 by General Peter B. Porter. It is one of the oldest existing houses in Buffalo and is in a fine state of preservation. The company has found it necessary to remodel the interior of the building, but the charming entrance doorway and the fine Palladian window have been carefully restored, and will long afford inspiration for the student of early American architecture.

Lead Bottle Ignition Battery.

Storage batteries, or "accumulators," are used for ignition work in foreign countries almost to the exclusion of other batteries, and the American automobile shows have indicated that the storage battery is rapidly gaining ground in this country.

Manufacturers are devoting a great deal more attention to this apparatus than for-

merly, and new and improved forms are being brought out. One of the latest is the "lead bottle" storage battery, placed on the market by the Dayton Electrical Mfg. Co., of Dayton, O., manufacturers of the Apple ignition dynamo.

The main feature of the bottle battery is its simplicity. Each cell consists of but two elements, a positive and a negative; the bottle itself, of lead, forms the negative element, and is grooved to take the active material, the grooves being of dovetail form to retain the composition. Rectangular perforations are formed in the positive plate to take the active material. There is but one plate in the cell, which makes the problem of securing it against movement a comparatively simple one. At the point where the connection from the positive plate projects from the bottle there is a rubber bushing which exactly fits the space, holding the plate in position and at the same time sealing the cell against leakage. A vent pipe carries fumes out and discharges them downward, where they can do no harm to connections or other metal fittings; a filling opening is provided, with a rubber cork to keep it tight.

Each cell has a capacity of 30 ampere hours at 2 volts, and any desired voltage is obtained by using the necessary number of cells. Rubber separators are placed around each cell, and others between the cells; the desired number of cells is placed in a metal case with a hard rubber bottom, and the empty space around the cells is filled with an insulating material, melted, poured in, and allowed to harden. All connections except the two main terminals are covered and sealed, and the whole battery thoroughly protected by this method. The filling openings are, of course, not sealed.

Smooth metal cases are used for the batteries; these cases can be slipped into wood boxes and may be snugly fitted, there being no protuberances or irregularities.

Connections between the units of each battery are of lead and are soldered; the joints are thus permanent, especially since they are embedded in the sealing material with which the case is filled.

According to the statements of the manufacturers, the lead bottle storage battery is lighter and smaller than a storage battery of the usual form of equal efficiency and output.

SHUGERS TAKE-DOWN RIM.

A detachable rim to fit the standard type of clincher tire has been patented by George Shugers, of Auburn, Ind., and it is understood that a tire manufacturer contemplates putting the rim in the market at an early date.

The permanently attached member of the metal rim is provided on one outer edge with a beading which is formed with a square faced seat to receive a detachable ring. This ring has two lugs, securely riveted and brazed on, designed for engagement with a hinged latch which is attached to the bead on the attached member of the rim. Although the rim is securely held together by means of the latch, inflation of the tire materially contributes to the security of the device.

It is claimed that in practical use a tire may be removed from the rim in eight seconds and replaced without the use of special tools. There are no loose pieces, and the entire device consists of but three parts—the permanent and detachable rim members and the latch.

RECENT LITERATURE.

A comprehensive special automobile number has recently been issued by the *Scientific Australian*, a quarterly publication printed in Melbourne and devoted to the arts and industries. The number is replete with the news and progress of the automobile world in the Antipodes and presents to readers a dissertation on the status of the self-propelled vehicle in that far-away continent. It is noticeable that several American cars are represented in the advertising columns of the number, and naturally a number of machines of English manufacture. The auto boat is given a prominent place in the text pages and an article states that power boats and speed launches to the value of more than $375,000 are in commission in the harbor of Sydney. Although the roads of southern Australia are extensive, the quality of the main highways is discouraging to the rapid growth of the automobile industry. Nevertheless, the most optimistic view is taken of the future of the automobile and motorcycle in Australia, and manufacturers of complete cars, tires and sundries are looking to that market for a considerable outlet for their product.

SECTION OF INTERIOR OF THOMAS FACTORY, SHOWING ENGINE ASSEMBLING DEPARTMENT, WITH OVERHEAD TROLLEY FOR TRAVELING CRANE USED IN MOVING HEAVY CASTINGS.

Kirkham Motors.

A line of automobile motors ranging from 12 to 24 horsepower, in three, four and six-cylinder types and several air-cooled engines for motorcycle equipment, comprise the 1906 product of the Kirkham Motor Mfg. Co., of Bath, N. Y. In addition, the company manufactures change-speed mechanisms and clutches suitable for assembly with the motors and transmissions.

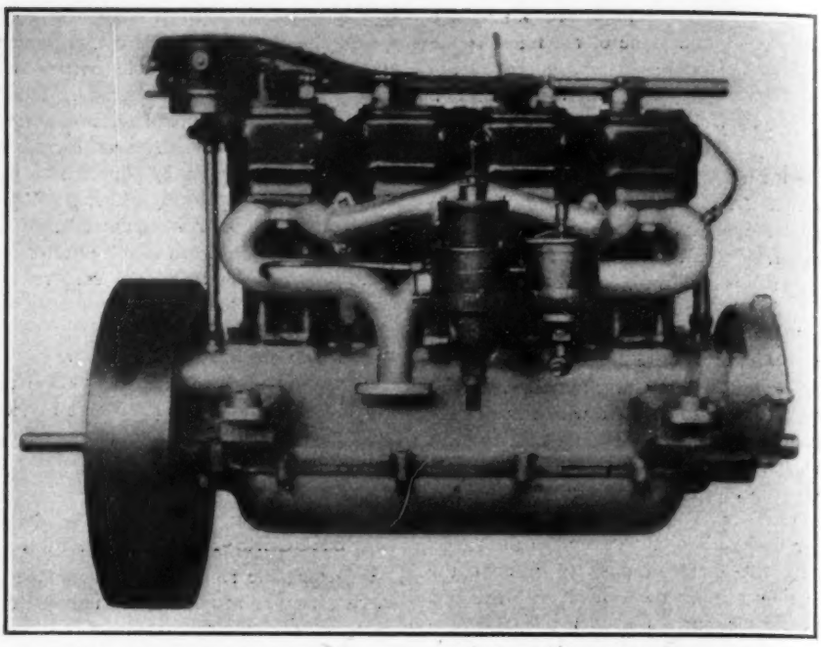
The 18-22-horsepower motor may be taken as typical of the line, the various other models being designed along similar lines with such changes and amplifications as necessary to provide other powers. The vertical four-cylinder water-cooled motor has interchangeable inlet and exhaust valves arranged side by side on the right-hand side. The bore and stroke are equal, 3 3-4 inches, and the motors are tested to give not less than 26 brake horsepower before shipment. The weight of the engine with flywheel is 265 pounds.

The cylinders are individual, with integrally cast water jackets and valve chambers, the latter of small dimensions with valves set close to the cylinders, giving an approximately cylindrical combustion chamber. Bores, also pistons and rings, are given their final finish by grinding. The connecting rods are drop forged with Parsons' white bronze bearings at the lower ends, while the upper ends are fitted to hardened tool-steel piston pins which are journaled in the piston bosses instead of in the connecting rods as usual, materially increasing the length of the pin bearings.

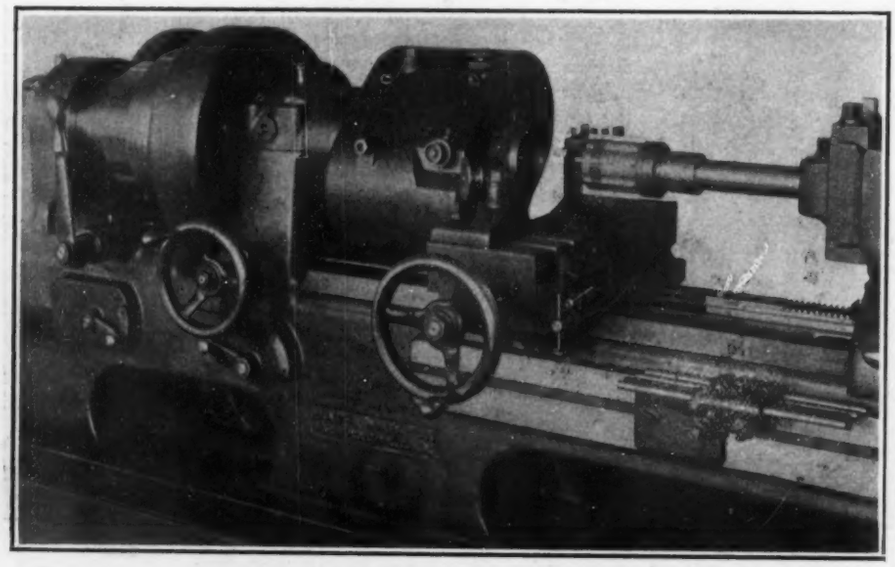
The five bearings for the hardened and ground crankshaft are fastened to the upper half of the crankcase by long, special steel bolts extending through to the top of the case, thereby relieving the aluminum casting from the strains from explosion. The bearings are phosphor bronze lined with Parsons' white bronze bushings, sweated in and hand-scraped to a fit.

The camshaft assembly is built up of hardened and ground steel shaft and case hardened cams, fitted with Woodruff keys and taper pins milled to exact size. Drive is through a steel gear on the engine shaft, driving a phosphor bronze and fiber gear on the camshaft, providing a smooth and noiseless transmission. All gears are housed in aluminum casings which are an oil-tight fit.

Ignition is through a combined timer and distributer, located back of the rear cylinder and driven by a vertical shaft actuated by a spiral gear on the camshaft, the gears being enclosed in an oil-tight housing. Motors are furnished complete with automatic carbureter, inlet and exhaust piping, spark plugs, combined timer and distributer, pressure oiler and water pump and piping. The location of the pump is at the front of the motor with drive through a cross shaft and bevel gears from the forward end of the camshaft.



KIRKHAM MOTOR WITH INDIVIDUAL CYLINDERS AND VALVES ALL ON RIGHT SIDE.



PRATT & WHITNEY TURRET LATHE SHOWING MOTOR CYLINDER IN CHUCK.

Cylinder Boring Lathe.

The 3 by 36 inch turret lathe herewith illustrated has been found a very efficient machine for finishing the interior and ends of small gasoline engine cylinders. It is a Pratt & Whitney lathe, made without the usual rod feeding device, but fitted with a special chuck for rigidly holding a cylinder and with turret and cross slide tools for boring the inside of the cylinder and turning and facing a collar at one end.

The work is gripped by means of two swinging clamps each operating against two fixed points. Both clamps have two bearing pins in the swinging member and consequently the work is perfectly supported at eight separate points while being machined. This complete support obviates the necessity of tight clamping, which usually distorts the casting to the extent that the bore is out of truth when the work is removed from the chuck, cylinders bored out on this lathe being perfectly true when finished.

The turret tools consist of rigid boring bars with high speed cutting tools. On the shank of one of the bars is a turning arm holding the cutter for turning the collar on the bottom of the cylinder, as clearly shown.

The reamer for finishing the interior of the cylinder is allowed to float on its shank and is of the expanding type. The cross slide and turret tools are both provided with independent power feed, each being in action simultaneously so as to economize time. The cylinder shown in the chuck has a bore of 4 inches and a depth of 7 inches. For the manufacturer who has not sufficient work to keep the machine employed solely on castings, a mechanism for rod feed through a collet may be applied so that regular rod work may be handled.

The Pratt & Whitney machine tools are sold in New York by the Niles-Bement-Pond Co., whose offices are at 111 Broadway.

Letter Box

Wood Alcohol and Glycerine Anti-Freeze

Editor THE AUTOMOBILE:

[306.]—Noticing in your last number the articles on non-freezing solutions, would say that in November last I purchased from the Autocar Company, of Ardmore, Pa., one of their 1905 four-cylinder cars, and as the cooling system holds about three gallons, I had it filled with a solution composed of one and one-half gallons of glycerine and an equal amount of water and then purchased a gallon of wood alcohol, which I added, a little at a time, as the water evaporated, until now, after running about a thousand miles, I have added the whole gallon. The motor in my car is quite a high-speed one, running up nearly to 1,500 revolutions at times, and this has been a warm winter; yet, in spite of this trying combination, the boiling has not yet been great enough to bother me.

I have laid the car up now for this month, and upon drawing off the contents of the radiator and filtering same, found that I had nearly three gallons left, and am confident this mixture will stand any degree of cold we get in this part of the country.

I did not try to close up the circulating system, as I did not regard the loss by boiling great enough to worry about.

My point is that this solution is at present composed of about two parts glycerine, one wood alcohol, and one water, yet in a high-speed motor the loss is not appreciable and it would need nearly Arctic weather to cause a freeze-up.

RICHARD A. STREIT.

New York City.

Double Bevel Gear Drive Transmission Not New.

Editor THE AUTOMOBILE:

[307.]—We note that you describe the improved form of transmission used by the Mercedes, Knox, and Bliss companies in the January 25 issue. We take it from your article that you assume this gear to be a new type of gear which has only recently been used on American or foreign machines. We beg to state in connection with this transmission, this type of transmission has been used on the Chadwick cars for the last three years.

We are inclosing herewith copy of letters patent, February 21, 1905, which you will note is somewhat in advance of the first description of this type of transmission used on the Mercedes car. The gear was used for nearly a year before the patent was applied for, and the patent paper shows the application to have been filed August 4, 1903. The description of the gear and drawings shown on this copy are practically the same as those used on the present Chadwick cars, with the exception of the ball thrust bearings, which have been added to the new transmissions.

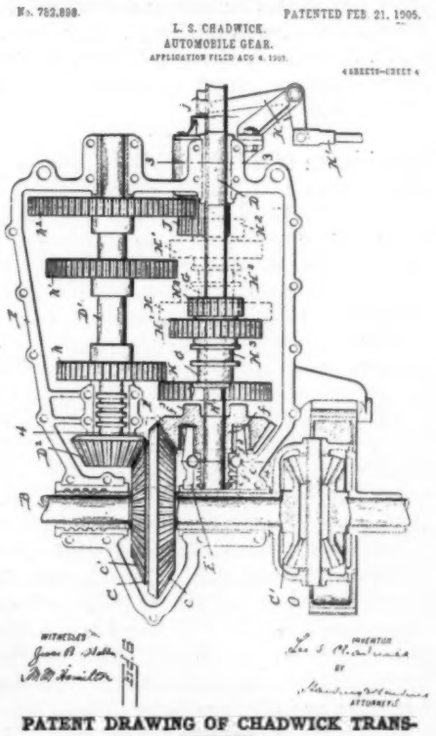
We also beg to call your attention to the fact that the Chadwick transmission is far simpler in its arrangement of clutch gears than the gears which you have described. You will note from examination that the case is very compact and allows for four forward speeds and one reverse, with direct drive on the high. By referring to your issue of November 2, you will find that you have already described this transmission as having been used on the Chadwick cars.

FAIRMOUNT ENGINEERING WORKS.

Philadelphia, Pa.

Following are the four claims on the Chadwick transmission as contained in the Letters Patent, No. 782,898, of which one sheet of drawings is reproduced herewith:

1. The combination with the driving-shaft of an automobile and a gear thereon,



PATENT DRAWING OF CHADWICK TRANSMISSION.

of a hollow bearing, a gear surrounding said bearing and meshing with the driving-shaft gear, said gear having a hollow hub entering the opening in said bearing and an operating-shaft having a seat on bearing in said hub.

2. The combination with the driving-shaft of an automobile and a gear thereon, of a hollow bearing, a gear surrounding said bearing and meshing with the driving-shaft gear, said gear having a hollow hub entering the opening in said bearing and an operating-shaft having a seat or bearing in said hub, and a clutch adapted to make engagement between the operating-shaft and the gear meshing with the driving-shaft gear.

3. In an automobile, in combination, an idler-gear, a bearing in which said idler-gear slidably fits, a shaft to which said gear is secured, a guiding collar, making a slidable fit with said bearing, upon said shaft, an operating-lever and connection between said operating-lever and shaft.

4. In an automobile, in combination, a gear-case, an idler-gear, there being an orifice in said casing in which said gear slidably fits, a shaft to which said gear is secured, a sliding collar, making a slidable fit with said orifice in said casing, upon said shaft, an operating-lever and connection between said operating-lever and shaft.

Some Points to Disturb Complacency.

Editor THE AUTOMOBILE:

[308.]—In your January 11 number are several letters on the automobile situation from some well-satisfied gentlemen in response to your request. They are to be congratulated as to their financial outlook, but their letters read like past forty.

None will admit that he don't grind cylinders, rings, all joints; that he has not the best carbureter; that he does not use balls or rollers everywhere possible; his transmission and control approach perfection. By all this he saves gasoline. It costs one cent a mile for gasoline to run a 2,200-pound car. Given a car with no friction and 100 per cent. engine economy, one-half cent per mile might be saved.

The consumer may select any standard American tire or the Continental. Mr. Alam or Mr. Alambedam refuses to take a stand here. Tires for the 2,200-pound car, after all is told, cost six cents per mile. Neither of the above gentlemen is paying any attention to this item of expense. He gives you your choice, and you can't blame him. Why don't he design a car to run on solid tires? It can be done and will be done with as much comfort to the passenger as now given. He can cut down the tire expense to one-half cent per mile. Why don't Mr. Pennywise wipe off his smirk and start after that five and one-half cents?

Anyone who ever steered a car all day knows how tired his arms were at night. Why doesn't Mr. Satisfied steer by power, as is done on boats? It can be done by touching a button, and the wheel which prevents the driver from saving himself at the last ditch could be eliminated. Mrs. Burton Harrison's chauffeur absolutely dared not let go of the steering wheel. Why don't Mr. Shortsight operate the emergency brake by the foot?

Can the balls or rollers be defended by correct theory? If they are perfect, is not the stress in them infinity? If they are not perfect, are they not running in a hollow of their own making, overcoming the resistance of inertia and elasticity? Does this not mean quick destruction? Is this not a sacrifice of all mechanical good practice to a selling point?

With increased knowledge maybe a car will be built without the gears and foolproof. But we can bear up under these.

A CRANK.

Buffalo, N. Y.

Riding Double with Difficulty.

Editor THE AUTOMOBILE:

[309.]—I have before me a clipping from a recent issue of your publication and note your comment upon an article which appeared in the January issue of *The Gleaner*, which I feel has been unfairly handled by you. Had you reproduced the article as published we would have taken no exceptions thereto, but you leave the impression with your readers that we are antagonistic to the owners of automobiles, which is not a fact. We recognize the fact that they are here to stay and we want to do all we can to educate the farmer that the automobile owner has rights and that he should do his share to bring about a better feeling, and that they should get in closer touch.

Please bear in mind that we shall always advocate drastic measures to the fellow who drives his machine through the country as fast as his power and the condition of the roads will permit, totally disregarding the rights of those who are unfortunately in his path, and who never stops to help those who are in distress, strewn by the roadside, oft-times with broken bones and smashed vehicles, caused by frightened horses not yet accustomed to automobiles. For such unprincipled whelps there is nothing too mean to do, and we are willing to stand on this platform.

You accuse us of making "grand-stand plays" to the farmer, and you, no doubt, are making the same kind of a move to the automobile owners, but we cannot see how you can help or better the conditions by commenting only on a few lines of the article in question, omitting the part which would have placed the matter in a light where any honest and fair-minded automobile owner would have indorsed every word we said. We are now compelled to follow up the matter and convince our readers and others that we are in the right.

I respectfully call your attention to the article inclosed, from our January issue, covering nearly a page, advising our readers how to get their horses acquainted with automobiles. I think we are fair.

Detroit. JAMES SLOCUM.

With no intention of being unfair in criticism, we do not see how the general trend of the article, which was too long to be quoted in full, can mitigate the specific recommendation made by the editor of *The Gleaner* for farmers to "trot out with a board filled with nails, lay it in the track, points up, and the 'dare-devil' will soon come to grief."

While this suggestion is made for adoption as a retaliatory measure against "the fellow who comes along with a machine, driving everyone to the fence corner, causing runaways, passing on with a grin," the act would be one of lawlessness, and it ought to be beneath the dignity of any reputable paper to suggest the correction of one evil by committing an equally illegal act.

There is the less excuse for the recommendation, since in the same editorial *The Gleaner* points out the proper and legal means for putting an end to the scorching evil, which all decent automobilists condemn. "All you have to do," it says, "is to take the number, which must hang in the rear of every machine, write to Lansing for the name of the owner, and make complaint before your local justice, and the sheriff will get the violator, no matter in what part of the state he may reside. He will stand a mighty poor chance of escaping conviction in your local justice court, and you certainly have the best of him." Even in this there is implied the well-known bias of country justices and jurymen against automobile users.

In view of the remarks made by the publisher of *The Gleaner*, both in his paper and in his letter, it is amusing to read the letter from one of his acquaintances printed in these same columns this week. It looks as if Mr. Slocum were having difficulty in riding with one foot on the horse and the other on the automobile.—ED.

Legislation Needed for Map Changes.

Editor THE AUTOMOBILE:

[310.]—Herewith please find copy of a letter containing the latest information regarding the Geological Survey maps. It seems that legislation is required. Anything that will assist the Director in securing this would, I should think, be greatly appreciated by automobilists.

A. POST.

New York City.

HON. WILLIAM P. BROWNLOW:

In reply to your letter of January 3, inclosing letter from Mr. Augustus Post.

The matter referred to—the distinction of classes of roads, that is, between macadamized or paved and dirt roads—has been under consideration. It is found that owing to the difficulty of making alterations in the symbol adopted representing roads on our atlas sheets, there being fifteen hundred of these atlas sheets already engraved, it would not be expedient or practical to show by an engraved symbol the distinction between macadamized roads and others. For the propose of a road map, especially designed for automobile traveling, the most satisfactory method would be by overprinting in some distinctive color, say red, such roads as may be used by automobiles. This could be done on all sheets for which special request is made. Doubtless in the eastern states this would affect every one of the eastern sheets, whilst in other sections of the country many sheets could thus be treated.

This office, however, is not authorized to expend its appropriation for the engraving and printing of maps for this purpose, and methods would have to be found to enable it to do so. There is now pending before Congress legislation which, if favorably acted upon, will enable the Geological Survey to adapt its maps to this purpose and to other purposes. The legislation contemplated authorizes this office to print maps of this kind at the request of private individuals or institutions, the money received from same to be turned into the Treasury, and to be credited to the appropriation from which it is expended. If this authority is granted, the Survey will then be authorized, on request received from individuals, associations, etc., to supply their needs.

I note what Mr. Augustus Post, Chairman of the Touring Committee of the American Automobile Association, says with respect to meeting the expense of this work by his association, but under the law this cannot be done. Should the legislation recommended become a law, the usefulness of the maps of the Survey would be greatly enhanced and would meet the requirements of the Automobile Association. CHAS. WALCOTT,

Director U. S. Geological Survey.

Change of Attitude Impending.

Editor THE AUTOMOBILE:

[311.]—I noticed an article in THE AUTOMOBILE a few weeks ago on the scattering of nails in the highway, in which you refer to the upholding of such acts by the publisher of *The Gleaner*, printed in Detroit, Mich.

I happen to be well acquainted with the publisher of this paper and think we have nothing to fear; in fact, I believe it will not be long before the articles in *The Gleaner* will be of a reverse nature, as the publisher has always been very desirous of owning an automobile, and has only refrained from a purchase because of his fear of "the gallery" to which he plays, but has finally got the fever to such an extent that I do not believe it will be possible for him to stay out of "the game" more than a few months longer at the most. V. M.

Detroit.

Horizontal Engine with Vertical Valves?

Editor THE AUTOMOBILE:

[312.]—Can you advise me who makes an automobile with double-opposed engine in front, of about 20 horsepower, with vertical valves, shaft drive and detachable tonneau? The chief consideration is the valves. I can find cars enough with horizontal action, but this is wrong design, as they wear on the side. R. L. S.

Deep River, Conn.

Wants Motor Cars for Railroad.

Editor THE AUTOMOBILE:

[313.]—A friend has asked me to make inquiry about gasoline motor cars for use on a five-mile suburban passenger and freight road to be built. Therefore, if convenient, will you kindly request any of your advertisers manufacturing these cars to communicate with me.

Pittsburg, Pa. ED. J. EVANS.

Patents

Buckboard Automobile.

No. 810,636.—L. B. Gaylor, of Waltham, Mass.

The friction drive of the Orient buckboard. The motor, instead of being mounted on the axle, is supported on the rear end of the main frame, with its shaft fore and aft. A friction disk on the front end of the shaft drives a wheel slidable on a sleeve on the cross differential shaft, which drives the rear wheels by sprocket chains. The friction disk itself is movable on the crankshaft to engage or disengage with the friction wheel.

Carbureter.

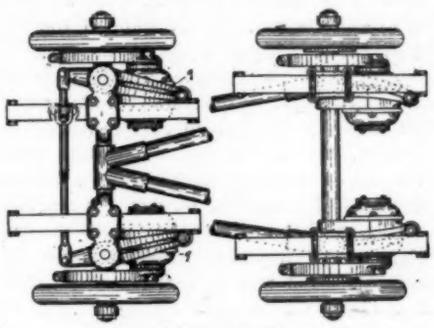
No. 807,144.—B. F. Walker, of Bridgeport, Conn.

This is a carbureter having a mixing chamber above the spray nozzle, partly closed by a shutter which acts as a throttle valve, and moves vertically up and down. Passing centrally through this shutter is a needle valve which partly closes the orifice of the spray nozzle, and the two are operated simultaneously by a pair of connected cams in such a manner that both are closed proportionately. An inverted conical compression spring, whose apex surrounds the spray nozzle, and which at its large end bears upward against the throttle shutter, contributes somewhat toward the mingling of the air and gasoline. As the shutter is pressed downward to close it, the upper coils of the spring, being weaker, close together first and restrict the passage of air to the lower coils, which are closer to the spray nozzle.

Multiple-Disk Clutch.

No. 810,783.—J. D. Maxwell, of Detroit, Mich.

The particular clutch construction shown. The driving shaft *A* carries a spider *C*, whose arms C^3 loosely engage notches in disks *H H*. The complementary driven disks *F F* move loosely on a feather *F'*, set in a hub *D'* keyed on the driven shaft *B*, and integral with a disk *D*. A three-armed carrier *J* is screwed on *D'*, and the dogs *K* which it carries are forced by the spreader *L* into engagement with disk *G*, thus locking all the disks together. Springs *I I*, riveted to disks *H H*, separate the latter when *L* is withdrawn. As is evident, no end thrust is imposed on *A*, whether the clutch is engaged or free. A special point is made of buttons H^3 of "abrasive" material set in holes in disk *H*, for the purpose of increasing the efficiency of the clutch.



PFOUTS FOUR-WHEEL DRIVE.

Spark Timer.

No. 804,783.—R. Varley, of Englewood, N. J.

A spark timer arranged so as to maintain a substantially constant time of contact regardless of changes in the engine speed. It has a set of contact makers, one for each cylinder (separate coils being used), and a separate cam, with as many lobes as there are cylinders for breaking the circuit. The contact breaker is wired in series with the four contact makers, and these with the several coils. The plates which carry the makers and breaker are so connected that when they are rotated to advance or retard the spark time, the maker plate moves further, thus allowing a longer dwell on the advance.

Muffler.

No. 807,322.—H. R. Selden, of Rochester, N. Y.

This is a muffler comprising a central cylindrical chamber and two annular chambers surrounding it. The gas enters the central chamber and moves a piston normally held by a spring about midway in the chamber, so that the spring is compressed to give the gas the entire length of this chamber for preliminary expansion. As the pressure falls between exhausts the piston returns to its first position.

Running Gear.

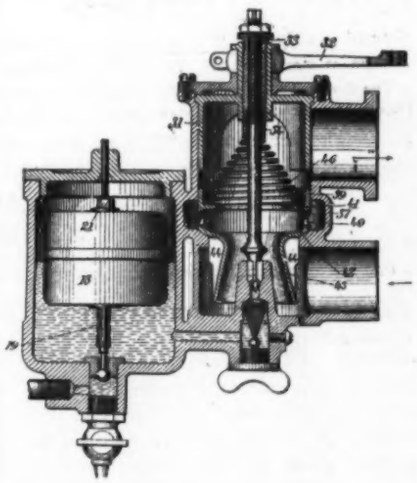
No. 810,881.—L. S. Pfouts, of Canton, O.

An electric four-wheel drive in which the steering knuckles are formed with extensions *9* to carry independent motors driving the front wheels by single-reduction gearing.

Carbureter.

No. 810,792.—J. McIntosh, of Lansing, Mich.

An automatic carbureter of the construction shown. The height of the float *18* is adjustable on the stem by means of the nut *21*, which acts as a stop against the pressure of the spring *19*. The main air stream passes upward inside the cone *43* and out between the coils of the spring *46*, which bears against an extension *41 42* of the cone.



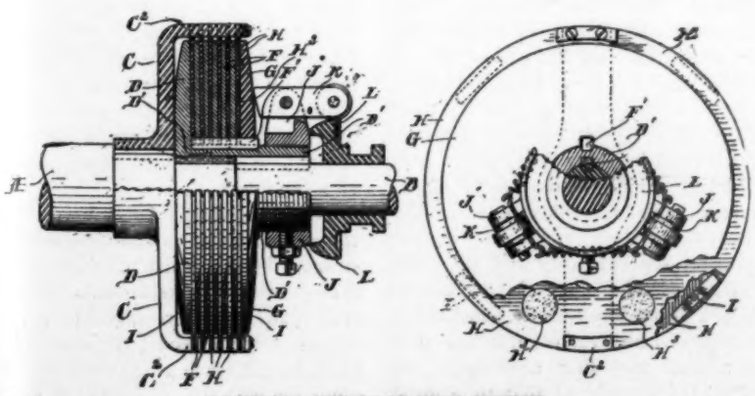
McINTOSH AUTOMATIC CARBURETER.

This cone is removable vertically, and is guided by vanes *44*. When the suction is sufficient, the cone lifts, and a part of the air stream passes up by the vanes to the annular space in *37*, and through holes *40* to join the carbureter stream, thus diluting the latter and also reducing the suction. The spray nozzle is adjustable by screwing the stem *34* up or down, and the tension of the spring by screwing the bushing *33*. The mixture is throttled by turning the shutter *31* by the lever *32*.

Motor Suspension.

No. 810,674.—F. B. Rae, of Detroit, Mich.

A frame for suspending an electric motor which drives the rear live axle by single reduction pinion and gear. One end of the frame is pivoted on the axle sleeve and the other is spring-supported. This eliminates part of the friction which would be entailed by pivoting the frame directly on the live portion of the axle, as is done in street cars.



MAXWELL MULTIPLE-DISK CLUTCH.

THE AUTOMOBILE

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The Western Show. Considering that the Chicago show is scarcely more than the transplanting of the show from New York a thousand miles westward, the exhibition loses none of its interest thereby. Rather its significance is increased. An eastern show at New York, inviting the eastern patron to an inspection of an eastern car designed for an eastern road map, at once would be an altogether different proposition to the removal of the eastern show bodily to the central market of the central west.

Chicago began more or less with the idea of a western show. It preserved the idea for a few years, but this season it may be said that the one-show idea is accepted—the eastern exhibitor going to the west and the western manufacturer reconciled to going to the east—all in recognition of the fact that because of mere geographical extent the country is demanding two show places for the present, with a question mark as to the possibility of a future far western center for exploitation. It may be said by some unthoughted ones that two great shows within a thousand miles smacks of repetition and extravagance; the answer may be found in the tremendous geographical stretch of the continent. If geography demands that the eastern and foreign exhibitors shall come west for an annual show, it also holds out to them the western market that is tributary to their business. If Chicago shall continue to be the market center for the west, Chicago must continue the show place; Mahomet must go to the mountain.

Going to the west, both the eastern and foreign builders are finding the incentive in the activities of the Chicago show. More foreign cars are represented there this year than ever before, and in spite of the fact that the eastern and the western car at home have been raised immensely in standards. It might be questioned if this representation of the foreign cars has been developed out of the demand already made for it, or whether because of a limited market in the east the foreigner is reaching out in the hope of a field. So far the foreign car in the Chicago market is not significant, but it may be marked on all sides that there is an increased interest in them. The Chicago Market is beyond that period when it was content to look on at the glint and shine of a hooded chassis and upholstered tonneau and forego looking underneath.

Foreign, eastern or western, the representative in the booth is demonstrating and he is expecting to be asked to demonstrate. It is nothing that the western fancy is caught by color combinations out of the ordinary. It is accepted that the open car over the covered vehicle shall be conceded to a popular taste. Technical and mechanical excellences are in the balance and in these the market is asking to be shown as essential points. The runabout types may hold crowded attentions of those who would drive cars if they could, but in the same breath the attentions are held of those who can drive the best if they would.

Geographically, a repetition of the New York show has become necessary. Commercially, it has become well worth while, even if the Chicago show management shall find it necessary, as this year, to expend $30,000 in preparation for the second event.

✷

Radiator and Hood Design. Unity of opinion among manufacturers of automobiles in the matter of exterior design is a reflection of the tendency toward finality of mechanical construction, which, while not yet reached, has at least set in. The day has passed when a car of any make can be identified as it flashes past on the street or country road, although many representative automobiles are characterized by some detail of radiator or hood design, giving them an individuality that makes their identification an easy matter.

The popular type of hood with the front closed with vertical radiator is the logical outcome of a desire to afford the most direct possible means of heat radiation to the cooling water, and was first used with the earlier Panhard models, at that time fitted with the round gilled-tube radiator. The Mercedes type set the fashion for cellular radiators, and of necessity was placed well up in front, closing the bonnet front and giving an excuse for the design now generally used in one form or other by far the greater majority of makers.

In spite of its popularity, this form of arrangement has some drawbacks, the most manifest advantage being the direct piping for the water and the favorable location of a fan to assist cooling, then again the placing of the radiator well up from the ground contributes not a little to avoidance of dust and dirt and accidental injury. The most serious drawback is the way in which the motor is fenced in, the wheels and mudguards on either side with the dash at the back and the radiator in front providing a compartment not always as accessible as it might be. In a number of instances the manufacturer has recognized the prime requisite of accessibility and by providing a considerable space between the motor and the radiator and a corresponding space at the back between motor and dash has earned the thanks of many an owner and driver.

In the matter of radiator design the cellular type has by no means been slavishly copied, though the general outlines have been so widely adopted that it may be accepted as no longer a detail for car identification. There are a few exceptions to the use of the straight or square hood with vertical radiator, such as found in the C. G. V. and Renault cars in France and in the Autocar runabout here. England also contributes a few examples, but the American builders, even of air-cooled cars, have so universally adopted this design that it will keep the car bearing it up to date in appearance doubtless for years to come.

✷

A Few Words for Dobbin. In the enthusiasm over broken records and the surpassing of the speed of the steam railway, it is well to remember that the possibilities of the automobile, while far beyond the expectations of a few years ago, are not fairly to be compared with other means of transportation. Each method of transportation—for speed contests are but the sporting element of the more serious problem of transporting man, mails or freight between given points—should be compared one with another relatively only. By far the most remarkable records, when so considered, still repose with the horse.

That this should be stated in a journal whose sole object is *equinectomy* may seem strange, but the spirit of fairness calls for a more careful consideration of speed records than heretofore given in the automobile press. The recent records made on the wave-ironed beach at Ormond should not be compared with the performances in the Van-

derbilt cup race or in the Glidden tour, yet such comparison is more reasonable than their comparison with the fastest times of steam locomotives, electric cars, bicycles or horses.

In a class by themselves—but for all that perhaps no less remarkable, and probably the most phenomenal records ever made in the way of covering ground between widely separated points and under adverse conditions—there is nothing in the history of the automobile comparable to the results attained in pioneer transportation in the Great West in the early days before the completion of the transcontinental railways.

That to-day almost insurmountable difficulties confront the transcontinental automobilist is an evidence of the seriousness of the problem when there existed little more than trails of the rudest sorts, yet the Pony Express, organized for regular mail service, was in active and continuous operation for more than two years with the record of but one failure in all that time. The total distance covered was 1,950 miles between the termini at Independence, Mo., and San Francisco, uniformly accomplished in ten days with relays of riders from sixty-five to 100 miles apart.

The equipment comprised more than 500 of the fastest western horses, about 200 station men and eighty riders. The daily average performances of the men and horses were in themselves remarkable, but the exceptional records such as a continuous ride of 384 miles in one case and of 340 miles inside of thirty-one hours in another are unrivaled in the history of transportation under adverse conditions. The star performance of this unique American enterprise was a relay trip over the full route of 1,950 miles in seven days and seventeen hours.

Given roads of fair surface and negotiable grades, the automobile can easily surpass these phenomenal records of the romantic Pony Express, and without the advantage of relays, but the only fair basis of comparison is not between the two widely different methods of transportation, but rather between the various performances of each. Railroad records are made under favorable conditions and are interesting when relatively compared; so, too, are the records made by the automobile; but the greatest value in such results as have been attained within the past few years is the increased fund of knowledge afforded the constructor rather than the new array of figures for the statistician.

ENDURANCE AND ECONOMY TESTS.

Two events decided upon by the Board of Governors of the Automobile Club of America for the coming spring and fall are an endurance and economy contest, for which two handsome prizes will be offered. A committee of seven members is to be appointed by the governors to formulate rules and conditions for the tests.

Rallying Against Drastic Jersey Bill.

TRENTON, N. J., Feb. 5.—One of the first signs of activity shown by the new Associated Automobile Clubs of New Jersey is the issuance last week of circular letters to automobilists throughout the state calling attention to the objectionable features of the Frelinghuysen automobile bill recently introduced in the New Jersey legislature. The fifteen principal provisions of the measure are chiefly summarized in a sheet urging all automobilists to use their influence through their representatives and senators, through garage and road-house proprietors and through their immediate friends to secure the defeat of the bill.

"We are anxious to have it understood," says Secretary J. E. Gill, "that as an association, we are in favor of legislation that is necessary to regulate automobiling; in fact, we have never refused to co-operate with the authorities for the punishment of offenders.

"The automobile law that New Jersey now has is generally considered one of the best and most reasonable in the country. We do not object to amendments to the existing law, if circumstances really demand it, but we are bitterly opposed to anything so drastic and unreasonable as the Frelinghuysen bill.

"First of all, we object to the Frelinghuysen bill because it proposes to establish an Automobile Department with a high-salaried chief, whose department will receive from $10,000 to $12,000 annually of the taxpayers' money. This money had better be spent on improvement of the roads of the state, especially when the present office of the Secretary of State has proven its ability to look after automobile affairs in a very satisfactory manner.

"We also object to the authority which the bill would invest in the automobile commissioner. He would have the right to dictate as to the kind of tire protectors, skidding preventers and similar devices to be used on machines, and this would open a channel for 'graft' and annoyance of all kinds.

"Then, again, we object because the commissioner would be the only person with power to renew a license that had been revoked by a magistrate, the bill giving to every magistrate power to revoke, but not to renew. Under such provision it would often be necessary for an automobilist from a distant part of the state to come to Trenton, to the automobile department, for a renewal of license, at much expense and inconvenience.

"We are not opposed to the paying of an annual registration fee based on the horsepower or the weight of the machines, but we think the Frelinghuysen rate of fifty cents per year per horsepower. together with an additional twenty-five cents per year per horsepower for the driver, is too much. It would compel automobilists to pay the state about $160,000 per annum, and this would be more than 50 per cent. of the entire road repair appropriation as now scheduled. To make six or eight thousand men pay half of the road outlay of the state does not seem to be just or reasonable.

"Then look at the absurdity of the provision making short-time tourists pay $1 per day license. The record breaker who crosses the state in a few hours without spending a cent would have to pay the minimum fee of $2. The man who tours about to the different resorts and spends several hundred dollars for a week's outing would have to pay several times as much. Summer commuters from seaside and country resorts would be put to a big expense or would be compelled to take out an annual license for their few months' stay. It would be better to have a registration fee reasonable enough to obviate the necessity for the short-time tourist class. Let all be treated alike, for automobilists of New Jersey are opposed to hold-up methods.

"The provision authorizing arrest without a warrant would subject thousands of respectable and innocent automobilists to the annoyance and expense of paying tribute to whatever county constable might choose to take them in custody. Then, again, the section which makes the fine limit $500 is a bad one. It would make it possible for any magistrate to impose that amount for merely trivial offenses. The present law is much better, as it graduates the fines according to the seriousness of the offense."

The Associated Automobile Clubs of New Jersey includes among its members some of the best known men of the state, a number of them being lawyers, while others are professional men of high standing, and several are members of the present Legislature. The result of the club's fight against the Frelinghuysen bill will be the introduction in the Legislature of a number of amendments to the present law, seeking to correct possible defects. These amendments will, it is expected, pave the way for the defeat of the Frelinghuysen measure. The amendments will be made satisfactory to automobilists and to the general public. They will probably be drawn by a committee of three automobilists and three farmers, as was done last winter when the present bill was framed.

The organization is affiliated with the American Automobile Association, and whatever assistance that organization can give will be forthcoming. There are 14,000 automobiles registered in New Jersey and 6,000 are owned by people living in the state. Of the resident automobilists fully 1,400 are members of the association.

OPPOSE JERSEY AUTO BILLS.

PHILADELPHIA, Feb. 5.—Local automobildom is as much wrought up over the Frelinghuysen bill, which is now before the

New Jersey Legislature, as are the auto owners of the state across the Delaware. In the event of its passage they will be as much affected by its radical provisions as will the Jerseymen; indeed, more so, for some paragraphs of the measure seem to be aimed at them particularly.

The $2 fee required of non-resident motorists on entering the state, with an additional charge of $1 daily thereafter during their stay, would be a serious matter to the great majority of Philadelphia car owners, who have been in the custom of "doing" Jersey on Saturday afternoons and Sundays whenever the weather is suitable. Then there is the clause against the use of chain grips and steel-armored tires on macadam roads; the provision giving simple justices of the peace the right to revoke a license and the heavy penalties.

The local dealers' organization and the Automobile Club of Philadelphia are preparing to invade Trenton not only to-morrow, when the committee will listen to objectors, but later on when the bill comes up for final passage—if it is not killed in committee. Backed by a strong array of legal talent, many members of both organizations will go to the Jersey capital to-morrow in an effort to scotch the snake.

The Jackson bill, introduced last week, while quite moderate in comparison with the Frelinghuysen measure, would bar from the Jersey roads all cars capable of traveling faster than twenty miles an hour.

AUTO TAX BILL IN ABEYANCE.

ALBANY, Feb. 5.—Senator L'Hommedieu has not pushed his bill to tax autos, and it remains in the Senate committee on taxation and retrenchment. Chairman Lewis of that committee says he has received several communications from automobile men asking for a hearing, but fixing no date, and so none has been set. Senator L'Hommedieu has not asked for a hearing yet, as he has an appointment to meet A. R. Shattuck in New York, and says he expects to meet other automobile owners and members of clubs and to see if some agreement on an automobile tax measure cannot be secured.

ROAD OILING BILL PASSES.

COLUMBUS, O., Feb. 5.—Owners of automobiles are much gratified over the passage, by the House of Representatives, on Friday last, of the Paxton Bill providing for the sprinkling of oil on macadam streets in cities and villages. It is claimed that in the long run this will be far cheaper than the use of water and will be a good substitute for asphalt. The author, who is an enthusiastic automobilist, declared sprinkling with crude oil would go far to remove the dust nuisance, which is also a spreader of disease germs. One sprinkling of oil would answer for a year, and would cost fourteen cents per lineal foot to abutting property owners, while the perambulating water cart costs much more, he said. The oil forms a crust which sheds water and resembles asphalt.

As it passed the House, the bill provides that streets may be sprinkled with oil, on petition of a majority of the residents of a street, at their expense, or five-year contracts for the use of oil may be authorized by the Board of Public Service in cities and the Common Council in villages, in which case only half of the cost is to be borne by the property owners.

NEW BILL IN OHIO.

COLUMBUS, O., Feb. 5.—A bill is being prepared for introduction in the Legislature, providing for a law governing the licensing of automobiles. It is proposed that the name of the city, as well as the number of the machine, be attached to each automobile.

Automobilists have organized a lobby to fight a measure pending in the House which restricts speeds on country roads and provides for certain actions when fractious horses are encountered and how much of the road autoists may have.

HORSE TRUCK RUNS DOWN AUTO.

New York city's new police commissioner, General Bingham, was involved in an automobile accident on the 5th instant that not only ruffled the temper of the commissioner, but resulted in damage to his big touring car. He was being driven eastward through Chambers street at a time when that thoroughfare was congested with traffic of all kinds when a heavy horse-drawn truck in charge of August McKibben crashed into the side of the car, staving in a couple of panels and otherwise damaging the machine. The chauffeur, a patrolman, tried to avoid the truck, but the driver swung into Chambers street at a rapid pace. The commissioner caused the arrest of the truck driver on the charge of reckless driving.

A Legislators' Outing.

A novel and most successful use of automobiles is illustrated in the accompanying engraving, which shows a party of legislators of the lower house of the Michigan legislature ready to start from Benton Harbor to make an inspection of the neighboring peach orchards last fall.

In the first car are Governor Fred M. Warner, Speaker S. F. Master, and Representative McKay. In line behind this are nineteen other cars occupied by some of the most prominent politicians, law-makers and business men of the state.

The occasion was meant as an object lesson to impress upon the legislature the importance of the Benton Harbor district as a fruit-growing section, and the trip was made in the height of the peach shipping season, during which 2,000,000 bushels of this fruit were gathered and shipped. The idea was conceived and put into effect by Sam H. Kelly, who represents one of the Berrien County districts in the state legislature. The automobiles were loaned by owners of cars living in Benton Harbor and St. Joseph.

Not only is great direct good sure to result from the trip, but it created a better feeling on the part of farmers and fruit-growers toward the automobile, that hundreds of soil tillers and country folk in all parts of the country previously considered a real "devil wagon." The progressive and successful fruit-growers liked the idea of loading up one branch of a state legislature and rolling it right onto their farms. Some of the farmers gave the visitors a tempting dinner under the fruit trees and made their call an enjoyable one. It was a function that did good all around, and one that may well be imitated by other sections of the Middle West.

THE GOVERNOR AND MEMBERS OF THE HOUSE OF REPRESENTATIVES OF THE MICHIGAN LEGISLATURE STARTING IN TWENTY AUTOMOBILES ON AN INSPECTION TOUR OF BERRIEN COUNTY PEACH ORCHARDS.

Fine Prospects for the Season in Omaha.

OMAHA, Feb. 3.—The year 1906 opens most auspiciously for the local automobile trade. Omaha and the country tributary to it are in a generally prosperous condition and dealers are sanguine that the sales in 1906 will be several times what they have been in any previous year. The Omaha garages contain a fine assortment of new models and the buyer will have here one of the best lots to choose from ever assembled between Chicago and San Francisco. The new models came out in advance of the big Eastern shows.

GARAGE DEVELOPMENT CONTINUES.

Garages and salesrooms have multiplied in Omaha until Farnam street from Twenty-first to Eighteenth street is known as "automobile row." The city now has five exclusive garages, three special buildings having been constructed for the purpose last year. One of these, that of the Powell-Bacon Company, became too small in a single season and will have its floor capacity doubled this spring.

Dealers expect to see the number of cars in the city doubled before the middle of summer. High-powered machines with light frames are not popular here, because of the hills in the city and the rolling country in the vicinity, which are severe on anything but the heavier and slower machines. These stand the wear and tear of the grades and poor roads better, and in general they are more satisfactory, because of their reliability.

AUTOMOBILISTS SECURE ROAD IMPROVEMENT.

Automobilists have done a great deal toward improving the roads near Omaha and in different parts of the state. As is usual in other communities, men of influence own many of the cars, and when they demand road repairs the result is generally observable. The Omaha Automobile Club appeared before the Park Board and secured repairs on Sixteenth street and had Dodge street paved with macadam from Fortieth street to a junction with a good county road leading into the country.

The club, which was organized last year, is preparing for an active season. One of the chief aims of the organization will be to curtail reckless driving. Not long ago a boy was run into and severely hurt on Farnam street, and the car escaped in the darkness, the accident occurring late in the evening. The club immediately offered a cash reward of $25 for information leading to the arrest of the driver, but his identity was not discovered.

Some talk has been heard of building a clubhouse, but this may not materialize this year, and the club will probably secure quarters with some other organization.

GOOD PROSPECTS FOR THE SEASON.

The Deright Automobile Company, the newest organization of the kind in the city, has just moved into the two-story building constructed for it at 1814-1816 Farnam street and now occupies the largest place in Omaha devoted to the business. On account of being conveniently located near the shopping district and with accommodations for showing a large line of cars in a handsome showroom, the company is certain to prove a strong factor in the local automobile market. Regarding prospects for the present season Mr. Bromwell, of the Deright company, says: "There has never been a year that will approach 1906 in the number of automobile sales, and Omaha will not run behind the rest of the country. Since January 1 we have received more than 100 applications for catalogues from out of the city from people who have not a ready opportunity to inspect our new models. We have booked a number of orders for later delivery, and indications point to our being sold out on our larger models by March 1. Our line includes the Stoddard-Dayton, Reo, Ford and Waverley electric."

R. R. Kimball, of the Kimball Automobile Company, whose new garage is nearly perfect, from an artistic standpoint, attended the recent races and speed trials at Ormond, Fla. His manager reports an excellent outlook for the coming year's business.

H. E. Frederickson, when in New York recently, added the Buick and Haynes cars to his line of Cadillacs and Peerless machines already carried.

DOING BIG BUSINESS WITH RAMBLERS.

The Rambler Automobile Company has just received a carload of 1906 models and they have been eagerly inspected by local automobilists. The Rambler people say they placed two cars of their make to one of any other in Omaha last year and expect to do even better in 1906.

J. M. Larson, one of the leading automobilists of the city, had a $6,000 Peerless car destroyed a few weeks ago by a fire and explosion in his garage. A match thrown on the floor ignited gasoline and grease, and in a few seconds the blaze was beyond control. Explosions followed and the automobile was totally ruined. It is likely that Mr. Larson will buy another car soon.

The "seeing Omaha" service originated by the Powell-Bacon Company last year proved so popular that it will be put in operation again in the spring, with the main station at the Paxton Hotel. It will be arranged especially to give tourists stopping here an hour or two on transcontinental tours an opportunity to see the city and its environs.

EFFECT OF THE OPEN WINTER.

INDIANAPOLIS, Feb. 5.—This city has had the most remarkable winter it has experienced in thirty years. Not once up to the end of January had the temperature fallen to zero, and snow has covered the ground but twice. As a result several storage warehouses that made preparations for an enormous business are greatly disappointed, for, instead of storing their cars, Indianapolis enthusiasts are driving them every day. One storage house prepared an entire floor at a cost of several hundred dollars and it has succeeded in securing hardly more than half a dozen cars for storage.

Garage men, dealers and manufacturers are jubilant, for increased sales and continuous repair work have more than compensated them for loss in dead storage charges.

Sales during the winter have almost equaled the sales of the summer months, and in addition orders for new cars are booked far ahead of possible delivery. Most of the local dealers have sold their sample cars and have orders placed for from one to three carloads of new machines.

COST OF SIGHT-SEEING SERVICE.

St. Paul will probably have a sight-seeing automobile line next summer. The Commercial Club has formulated a plan which it is thought will bring about the establishment of such a service, which the city has felt the need of for years. A special committee appointed to investigate has returned a favorable report, embodying the following estimate of the cost and expense of operating one automobile car one season and the income from same, based upon having 100 pleasant days, between May 1 and November 1:

Investment—two automobiles	$6,000	
Interest	360	
Four hundred days' labor	2,000	
Repairs, stationery, etc.	200	
Advertising	200	
Insurance, wear and tear	1,200	
Gasoline and oil	400	
Liability insurance	300	
Salary of manager	600	
Rent of garage	150	
Total	$5,410	
Four hundred trips, twenty passengers each, $1		$8,000
Profit	2,590	
	$8,000	$8,000

In this estimate no mention is made of extra trips, such as private parties, moonlight trips, and the extra business that could be done during the sessions of conventions meeting in the city.

TRADE SLOW IN MEMPHIS.

MEMPHIS, TENN., Feb. 5.—The total number of new cars sold in Memphis last season was less than one dozen—and that in a city which claims 170,000 inhabitants, where money is plentiful, prosperity undoubted, and the people enjoying sport. Man for man, and dollar for dollar, Memphis is probably the least progressive city in the South, from an automobilist's standpoint. No blame can be laid at the door of the yellow fever quarantine which had Memphis isolated for two months last summer. On the contrary, fear of yellow fever drove a few residents to

Northern resorts, where some of them acquired the "bacillus motori."

In the face of such discouragement the local dealers are hopeful, new cars are coming in and two new dealers are planning to enter the field.

Frank Blomberg & Co. have a handsome new garage, one of the largest in the South, with plenty of money and enthusiasm behind them. They are a new concern and sell Thomas, White, Buick and Baker cars.

Harry A. White, one of the veterans, with plenty of backing and enthusiasm, handles the Cadillac and Pope-Toledo.

Jerome P. Parker, with a garage of fair size, is agent for the Olds.

The MacDonald Automobile Company, which has a good garage, sold Whites last year, but is undecided which car will be handled this season.

The coming season should be better than any in the past. The weather has been ideal nearly all the fall and winter and the few car owners are enjoying the good roads and the fine weather.

A LANSING CONSOLIDATION.

Olds Gasoline Engine Works to Absorb Gas Producer Company.

LANSING, MICH., Feb. 5.—Consolidation of the Olds Gasoline Engine Works and the American Suction Gas Producer Company will result from action taken at the annual meeting of the former corporation in this city. This will be effected through the purchase of the American Suction Gas Producer Company by the Olds Gasoline Engine Works, but the combined corporations will be known as the Olds Gas Power Company. To the capital stock of $500,000 of the engine company will be added $112,000 for the purchase of the other company, making the capital of the Olds Gas Power Company $612,000.

The business of the two corporations is closely identified and the largest interests have been held by the same persons. The Olds Gasoline Engine Works is a pioneer in the manufacture of engines using gasoline for a motive force, and make engines up to 1,200 horsepower. The American Suction Gas Producer Company was organized a few years ago to manufacture a producer of gas from coal for use in explosive engines.

The directors in the Olds Gasoline Engine Works, who may hold their positions under the new corporation, are James H. Seager, F. L. Smith and S. S. Olds, of Lansing; Henry Russell, H. H. Ledyard and H. C. Potter, Jr., of Detroit. The officers are: President, James H. Seager; vice-president, F. L. Smith; secretary-treasurer, Schuyler F. Seager; general manager, James B. Seager.

The report of the company showed a most active year, during which about three times as many engines as ever before were manufactured. Very satisfactory earnings on the stock were shown, and a dividend in accordance with the report was declared.

TWO-CYCLE ENGINE PATENTS.

Sintz and Cock Patents Thought to Cover Three-Port Construction.

DETROIT, Feb. 5.—Automobile manufacturers who use three-port, two-cycle engines in their cars, and the builders of power boats, will be much interested in the news that a patent fight is in sight.

James Whittemore, the Detroit patent attorney, has acquired the Sintz patents on the three-port, two-cycle engine. Joseph Day, an Englishman, owns the Cock patents covering the same features. Both claim their patents to be valid. The situation is thus stated:

Day's patent was issued to F. W. C. Cock, the English patent being dated October 15, 1892. Application for a patent in the United States was filed March 10, 1894, and patent No. 544,210 was granted to Mr. Cock on August 6, 1895.

The Sintz patent was granted to Clark Sintz, of Springfield, Ohio, November 21, 1893, the specifications for it being filed October 27, 1892. Briefly stated, Mr. Sintz's patent related to gas engines, and the object was to produce a gas engine in which high speed could be attained and maintained. A further object was to produce a means whereby an explosion could be secured for each crankshaft revolution. A further object was to produce a novel arrangement of the supply and exhaust ports in connection with the piston, whereby a substantially valveless engine could be produced.

The Cock patent covers the same ground, according to experts, and here is where the chance for fight comes in. It is stated that Mr. Day, owner of the Cock patents, is sure of the legality of his patents in the United States and is coming to this country to make good his claims.

PARTS COMPANY EXPANDING.

FLINT, MICH., Feb. 5.—The Auto Brass and Aluminum Company is preparing to make extensive improvements in its plant in order to take care of increased business for 1906. New machinery will be purchased, a new factory building is contemplated, and the entire organization will be immediately expanded. The company has contracts on hand for 1906 to furnish fittings to the Reo Motor Car Company for 1,600 cars, to the C. H. Blomstrom Motor Car Company for 1,500 cars, to the Jackson Automobile Company for 1,000 cars, to the Bartholomew Company for 500 cars, to the Cadillac Motor Car Company for 3,000 cars, and to the Northern Manufacturing Company for 750 cars. The company will also furnish accessories for the complete output of the Buick Motor Company for 1906. The total amount of the contracts secured up to the present time is about $100,000.

FORD MFG. CO. INCORPORATED.

DETROIT, Feb. 5.—The Ford Manufacturing Company has leased the buildings formerly occupied by the Hayes Manufacturing Company on Bellevue avenue, south of Mack, for one year and will manufacture small automobile engines and automobile parts. The company will probably erect a factory and will be an important addition to the industries of the city.

The Ford Manufacturing Company was incorporated several weeks ago with a capital stock of $100,000. The officers are: President, Henry Ford; vice-president, John F. Dodge; treasurer, James J. Couzens; secretary, C. H. Wills. The above, with John W. Anderson, form the Board of Directors. The other incorporators are H. H. Rackham, C. H. Bennett and H. E. Dodge.

NEW YORK TO KOKOMO IN WINTER.

INDIANAPOLIS, Feb. 5.—His machine covered with the mud of half a dozen states, and himself almost exhausted, J. W. Haynes, of the Haynes Automobile Company, of Kokomo, drove into Indianapolis a few days ago after a memorable trip in a 50-h.p. Haynes from the New York show.

Rain, sleet, snow and heavy winds were encountered, but the machine and driver

ONE OF THE EVIDENCES OF ACTIVITY IN THE INDUSTRY—FRANKLIN FACTORY IN SYRACUSE WHEN NIGHT SHIFT STARTS WORK.

held out against them all and made the trip with little difficulty excepting tire troubles. These were frequent and discouraging.

Mr. Haynes left New York city on Sunday noon, January 21, accompanied by J. C. Elikoff, an expert mechanic. Not having a license to travel through the state of Pennsylvania, Mr. Haynes was obliged to stop an extra day in Philadelphia, but the rest of the trip was made without long delays, often traveling far into the night.

The big machine climbed over the Cumberland Mountains, but instead of snow, as might have been expected, a sea of mud was encountered, and in coming down it was necessary to put on power, the mud being so deep. At other times during the trip the wheels had to be wound with ropes to prevent them from spinning.

The trip was made by way of Philadelphia, Reading and Harrisburg, Pa.; Hagerstown, Md.; Wheeling, W. Va.; Zanesville and Columbus, O., entering the Hoosier state at Richmond. Owing to tire troubles it was necessary at one time for the machine to run thirteen miles on a flat tire. The longest mileage for one day was 135 miles.

MOTORCYCLE MEETS PLANNED.

MILWAUKEE, Feb. 5.—George H. Gardner and Charles Hall, representing the Chicago Motor Cycle Club, were present at a meeting of the Milwaukee Motor Cycle Club last Thursday night, the object of their visit being to arrange a schedule of events for the coming season. It was decided to hold a track race meet at Chicago on Decoration Day (May 30), a race meet or reliability test at Milwaukee on July 4, and a race meet at Muskegon, Mich., on Labor Day, September 3. The Milwaukee club has in view a series of races on a 21-2-mile straightaway or a run of 100 miles on a ten-mile circuit. The Goodrich Cup, which is now in the possession of the Chicago club, will be contested for on Decoration Day by Milwaukee motorcyclists. The club now has twenty-five members, and B. P. Churchill is president.

OVER-LAKE AUTO TRAFFIC.

MICHIGAN CITY, IND., Feb. 5.—There is sure to be a big movement in automobiles here next spring. A great business is transacted by the steamboats in carrying machines across the Lake Michigan from Chicago. Auto tours are commenced from the docks on the Indiana and Michigan sides, thus avoiding a great stretch of sandy roads in Michigan.

The county authorities of Laporte county have spent a deal of money in improving the local road system. There is a good mileage of macadamized roadway and this is being increased all the time.

Next season Michigan City will take on considerable importance as a summer resort. The new steamer, *Theodore Roosevelt*, now being built at Toledo, will be the largest boat on the lakes, and will ply between Chicago and this city.

DEAD HORSE HILL CLIMB IN DOUBT.

WORCESTER, MASS., Feb. 5.—There is considerable doubt in the minds of many of the members of the Worcester Automobile Club as to whether or not the Leicester authorities will sanction the holding of another automobile hill climb on Dead Horse Hill. Since the event of last year, which gave the hill a national reputation, the Worcester club and the Leicester authorities have had many a clash, and the result looked for is the refusal of the authorities to sanction the contest on that part of the hill that comes within their jurisdiction.

There seems scarcely any doubt that Channing Smith, chairman of the Board of Selectmen, who was greatly incensed over the action of the club in connection with the funeral march of Glidden tourists through Leicester last summer, will swing the town against the club. Mr. Smith is a wealthy mill owner and has considerable influence.

HITCH IN CHICAGO CLUB PLANS.

CHICAGO, Feb. 5.—The members of the Chicago Automobile Club are again balked in their movement for a new clubhouse, as the deal with Mrs. Hetty Green for the property on which the present clubhouse stands has fallen through. The papers were ready to sign, and it looked as though everything would turn out as planned, when there came a hitch regarding the time of the lease. Mrs. Green refused to tie up her property for as long a period as thirty years, and the C. A. C. committee would not be satisfied with less. The building committee will make known its plans in a few days.

JERSEY CLUB BANQUET.

NEWARK, Feb. 6.—The New Jersey Automobile and Motor Club will hold its third annual banquet on Thursday evening, February 15, in the Continental Hotel, Newark. Each member of the club will be provided with one or more tickets. The affair will not be limited to club members by any means, as anyone wishing to attend will be welcome. President James R. English will preside at the table. There will be several good speakers and musical entertainers. The committee in charge of the banquet consists of Jacob Mason, Horace P. Cook, George Paddock, C. S. Calvert and C. E. Stengel. Those who intend to be present may inform the committee and designate where they prefer to sit, which will make it possible for members and friends to be together.

NEWS NOTES OF THE CLUBS.

PHILADELPHIA.—The annual election of the Philadelphia Motorcycle Club resulted in the choice of the following officers to serve during the coming year: President, Valentine Simmons; vice-president, Adolph Wicknick; captain, Harry Scheiter; first lieutenant, John Benders; second lieutenant, Joseph Lees; color-bearer, George W. Reingold. The P. M. C. now has a membership of nearly half a hundred, mostly "Indians," and a clubhouse of its own. A schedule of weekly runs for the coming season will shortly be announced by Captain Scheiter.

DAYTON, O.—The Dayton Automobile Club will hold a race meet July 4 at the Montgomery Fair Grounds track. There will be a large entry list and silver trophy cards will be awarded the winners.

PITTSBURGH.—A meeting will be held in this city about March 1 to perfect the organization of the Pennsylvania Motor Club Federation, to be composed of automobile clubs or associations and consulates of the American Motor League in Pennsylvania. A preliminary meeting to discuss the matter was held in New York city on January 16 during the automobile show. The Automobile Club of Pittsburg and the A. C. of Philadelphia are co-operating in the matter. The principal objects are to endeavor to secure the enactment of fair laws regulating the use of automobiles and other vehicles, to advocate the cause of good roads and to further the best interests of automobilists in general.

FATAL GARAGE ACCIDENT.

An unusual accident on February 5 resulted in the death of J. Emmett Gordon, garage superintendent for Smith & Mabley, Fifty-fifth street and Broadway, New York city. The accident occurred in the basement of the building, where Mr. Gordon had just taken a seat in a small electric runabout to drive on to an elevator preparatory to a short trip to the West Forty-seventh street police station with his friend, Frank Clark, to have him sworn in as a special officer for service about the garage.

The car stood near the elevator shaft and Mr. Gordon had his foot on the brake pedal. He was under the impression that the controller was in the position for cutting off the power, but when the foot brake was released, as the runabout stood about three feet from the edge of the elevator shaft, the car moved forward under first speed and the front wheels slowly slid over the edge of the opening, throwing the driver head first over the dash of the vehicle. The drop was only about three feet, but the unfortunate superintendent struck head foremost, fracturing his skull, and died about an hour later in the Roosevelt Hospital.

The elevator at the time was descending and was between the first floor and the cellar, but the operator stopped sharply on hearing the crash. The car was found to be only slightly damaged, with the brakes unset and the power on.

Gordon was thirty years of age and unmarried. His relatives live in Lexington, Ky., his former home. He had been in the employ of Smith & Mabley for a year and was well known in the automobile trade and to automobilists.

To see the two-mile-a-minute record beaten, shall we have to await the perfection of the airship?

News and Trade Miscellany.

The first 24-hour non-stop automobile run chronicled west of the Mississippi was made on January 26-27 in Denver by M. B. Fetscher and Charles Bilz. A regular stock model G Franklin car of 12 horsepower and carrying four passengers was used, and Fetscher drove during twenty out of the twenty-four hours. The start was made at 12:30 P. M., Friday, January 26, and during the greater part of the day the car traversed the downtown streets of the city; trips were also made into the suburbs. Observers accompanied the car throughout the test. The actual distance traversed was 325 1-2 miles, and although a number of stops were made, the engine was kept running. In the twenty-four hours 19 1-2 gallons of gasoline and 3 quarts of lubricating oil were consumed.

Charles J. Glidden, who is touring the world in an automobile, has been heard from in Muttra, India, in which country he covered a distance of 3,350 miles, bringing his total mileage up to 28,450.

The John D. Spreckles Cup for the endurance run from Los Angeles to San Diego, held on January 25 and 26, has been awarded to Charles A. Hawkins, who drove a White steam car carrying five passengers and fifty pounds of baggage.

In many of the popular sizes of tires the Diamond Rubber Company has not been able to make deliveries since November from the Akron factory or from the branch stores. But in the interim the company has been adding to its equipment and now announces that all business can be taken care of, the branch stores having again been completely stocked.

E. D. Winans, general manager of the Michelin Products Selling Company, Inc., a corporation which controls the sale of Michelin tires and products in the United States, reports that Michelin & Cie., the parent company, is doubling its plant in France, and that, when completed, the company will turn out about 1,600 tires a day. The American company will establish a factory in the United States this year, under a license from the parent company.

E. B. Gallaher, American agent for the Richard Brasier, has opened a Paris office at 11 Rue d'Alger, which will be in charge of a competent man familiar with all the principal languages. Automobilists touring in Europe may have their mail sent to this office for proper forwarding.

During the week of February 12 the Banker Brothers Company, of Pittsburg, will have an automobile show in which the New York displays of the cars which they represent will be reproduced. Chassis of the Pierce, Cadillac, Stevens-Duryea and Studebaker will be shipped there directly after the close of the Chicago show. These will be shown at the Bankers showrooms at 239-241 Diamond street, which will be opened for the first time on February 5. The company will also have the three Cadillacs which were exhibited in New York.

Samuel M. Miles, manager of the Chicago Automobile Show, gave a dinner to some of his newspaper and automobile friends at the Sherman House on Thursday evening, February 1; a number of other dinners will be given during show week.

The H. T. Hearsey Vehicle Company, of Indianapolis, has opened its new automobile annex and now has one of the largest garages in that city. It is located in a building just across from the offices and salesroom and has been equipped with all modern appliances for caring for and repairing motor cars. In addition to repairing and storing cars, the company will handle the White, Pope-Waverley and Rambler lines for 1906. They have already had satisfactory sales on these cars this year.

The American Motor Car Company, of Indianapolis, is making its formal début at the Chicago Automobile Show. The company has completed two cars, one of which was placed on exhibition, while the other is being used for demonstrating purposes. Fred I. Tone, the new general manager of the company, has charge of the Chicago exhibit.

The Atlas Automobile Company has secured the Pittsburg agencies for the Maxwell and Premier cars. The company's territory extends over western Pennsylvania, southern Ohio, western Maryland and West Virginia. Sub agents will be named at once.

The latest addition to Philadelphia's "row" is Connors & Gilmore, who, in addition to the Ratchet-Schneider cars, will handle a large line of automobile supplies. They have secured quarters at the southwest corner of Broad and Vine streets.

At the annual meeting of the Olds Motor Works directors were elected for the coming year as follows: H. B. Ledvard, Henry Russell, H. C. Potter Jr., and S. L. Smith, of Detroit; James H. Seager, F. L. Smith and Angus Smith, of Lansing. The officers are: President, Henry Russell; vice-president and general manager, F. L. Smith; secretary and treasurer, Angus Smith. Prospects for the largest business ever handled were reflected in the statement that advance bookings of orders amount to $2,250,000.

The Dudley Automobile School of Boston has opened a branch in the Walker business block at Worcester to handle the Worcester county business. Already there are nearly 100 students enrolled, there being two lectures a week.

The polished chassis, which formed part of the Packard Motor Car Company's exhibit at the New York Madison Square Garden Show, has been sold by the company to Mrs. F. A. Fuller, of Paris, to whom the car will be shipped after the close of the Boston show. The machine is to be fitted with a body by Rothschild, of Paris.

The Newcomb Motor Company, 378 Jackson avenue, Long Island City, N. Y., has superseded the Commercial Motor Company and the Mercantile Motor Company, of Marion, N. J.

The Aerial car is to be represented in New York city by the Covell & Crosby Motor Company, located at 1621 Broadway.

Two orders for commercial vehicles recently closed by the Knox Automobile Company, of Springfield, Mass., were from the Fall River Bleachery for one of the company's three-ton trucks, and from the Fall River Gas Company for a No. 46 single-cylinder commercial car.

William Shrive, Yonkers, N. Y., agent for the Cadillac cars, recently completed his new garage at 64-66 Warburton avenue, that city.

The Standard Welding Company, of Cleveland, O., states that the Stanley steam racing car that made such a remarkable record at the Florida beach carnival was fitted with steel rims made by the Standard company.

Joseph Bentley, Methuen, Mass., has just placed on the market a high grade of curled hair especially adapted for use in auto cushions.

A salesroom and garage will be opened in Saginaw, Mich., at 114-116 South Franklin street, in the near future. The proprietor of the establishment, George J. Bohnet, has secured the agency for the Reo cars for Saginaw and Bay City, Mich., his territory including the surrounding fourteen counties.

Recent purchasers of Locomobile cars include the mayor of Rochester, N. Y., James G. Cutler, and his brother, J. W. Cutler, and R. A. Sibley, of Rochester.

The Michigan State Tax Commission is making a crusade for the taxing of automobiles. It has sent a list of machines owned to the assessors of all cities with a request that they be placed on the tax rolls against the owners.

A consignment of a block-and-a-half-long string of Ford cars, en route to the Philadelphia branch of the company, attracted much attention on Broad street, that city, last Thursday.

Carl G. Fisher, the pioneer automobile man of Indianapolis, while at the New York shows placed an order for an airship to be built at a cost of $3,000. Just what he intends to do with it is not known, but it is most unlikely that he will forsake the automobile for aerial navigation.

Israel Hoagland, an Indianapolis inventor, has perfected a motor to be used in plowing, and it is said that it can also be utilized to run farm machinery. The inventor is now in Chicago organizing a company to put the new machine on the market. Several progressive Indiana farmers have been running farm machinery by gasoline motors for some time. Last summer those who were sufficiently up-to-date to own automobiles ran their machinery with the automobile engine.

C. H. Saunders has opened a salesroom in the new Park Square Motor Mart, Boston, Mass., and will represent the Moline cars in New England.

The Babcock Electric Carriage Co. has arranged with the Decauville Automobile Co., of New York, whereby the latter will represent the Babcock company in Greater New York and northern New Jersey.

The garage of the Chelsea Auto Storage Co., located in New York at 516-520 West Thirty-seventh street, is devoted exclusively to the storage and repair of commercial vehicles, being fitted up especially for this branch of the industry.

Dolson automobiles will be represented throughout New England by the Imperial Automobile Co., with salesroom at 1024 Boylston street, Boston, Mass.

On March 1 a garage will be opened in Lexington, Ky., by C. Ora Updike, whose establishment will be ample to care for all tourists visiting the city, as well as local trade. A repair department, in charge of competent mechanics, will be a feature of the establishment.

Attention has been called to an error in the advertisement of the Elmore Manufacturing Company, of Clyde, Ohio, as it appears on page 174 of the January 18 issue of THE AUTOMOBILE. Obviously, as the text clearly indicates, the cylinders should be numbered 1, 3, 4, 2, in the sectional illustration of the Elmore engine, and not 1, 2, 3, 4, as they are numbered.

On Tuesday of this week the first shipments were made of the new steel wheels manufactured by the Iron Tire Penumatic Wheel Company, 251 Fifth avenue, New York City. These wheels comprise a wheel within a wheel, a pneumatic ring or cushing being interposed, while the outer rim is shod with a solid rubber tire, whereas the old experimental wheels, which were made by hand in a blacksmith shop, weighed 185 pounds each, the new ones as put on the market are asserted to weigh but 74 pounds. They are of 30 inches diameter; the larger diameters are not yet ready. A demonstrating run on a set of the new wheels is to be made between New York and Boston as soon as preparations can be made.

INFORMATION FOR BUYERS.

STORAGE IGNITION BATTERIES.—The storage batteries recently placed in the market by the New England Motor Co. of Lowell, Mass., are claimed to possess a high degree of efficiency combined with moderate cost The company at present is offering two styles, a four-volt equipment and a six-volt, the respective weights, ready for use, being nineteen and twenty-seven pounds. The cells are put up in neat hardwood boxes thoroughly sealed and fitted with non-corrosive terminals. A leaflet is issued by the company describing the batteries and setting forth the advantages of the storage battery for ignition purposes as contrasted with other sources of electrical energy.

HOUSE ORGAN.—A new house organ has appeared in the *Reo Echo*, issued from the Reo Motor Car Co., of Lansing, Mich. The initial number is a robust journal and promises to promote the publicity of the already well known Reo line. The announcement of the publisher conveys the information that the *Reo Echo* will be issued at convenient intervals by the sales department of the company and that it will be sent free anywhere. In size the organ corresponds to other publications of a similar character and the thirty-two pages are filled with interesting items for the owner and the prospective purchaser. A number of pages are devoted to the Reo *Mountaineer*, with a number of illustrations of the varied experiences of Megargel and Fassett in the wilds of Arizona, and altogether the little magazine is replete with stories and facts of interest to automobilists in general.

GASOLINE HANDLING OUTFITS.—A complete catalogue of gasoline and oil tanks and pumps has been issued by the National Tank Co., of Dayton, O., manufacturers of self-measuring, computing and registering pumps and storage tanks. The outfits are made in all sizes, suitable for a small private garage or a large public establishment where large quantities of gasoline and oil have to be handled constantly. The pumps do their own measuring and indicate the price of the quantity pumped; a discharge register keeps tally of the total number of gallons passing through the nozzle—a useful feature where large cans or tanks are being filled. The nozzle is made to avoid drip, and there is no waste or spreading of oil. An indicator shows the amount remaining in the tank at any time. Outfits are made with tanks and pumps separated as widely as may be desired, so that the tank may be in the cellar and the pump on a higher floor; or the tank may be underground, outside the building, and the pump in the building in a locked cabinet. Cabinets are made in all styles—roll tops, glass doors, all metal, square, round or any desired form.

GARAGE JACKS.—The advantages accruing from the practice of lifting the car, when not in use, so that there is no weight on the tires, is emphasized by the Bicycle and Stepladder Company, of 65 Randolph street, Chicago, in placing on the market a jack

GARAGE JACK SHOWING WHEEL RAISED.

designed especially for this purpose, and intended for garage use. The jack is simple and substantial in construction. It consists of a T-shaped structure of hard wood, the long member of the T being the handle. One end of the head of the T carries a crotch to fit under the wheel hub, while the other carries a roller. In use the crotch is placed under the hub and the roller rests on the floor. Pressure is applied to the long handle, forcing the roller under the hub, at the same time raising the car. The roller passes under the center line of the hub and the handle then rests on the floor, making a firm support. The jacks are made in sets of four, one for each wheel, and are made in two styles—adjustable and semi-adjustable.

MILLER'S ANTI-FREEZE.—An anti-freezing compound for use in the cooling systems of gasoline automobiles is manufactured and sold by Charles E. Miller, of 101 Reade street, New York. The compound is put up in tightly closed ten-pound cans. Ten pounds of the compound added to two gallons of water will give a mixture which, it is claimed, will not freeze at 15 degrees below zero. Ten pounds to six quarts of water will resist a temperature of 30 degrees below zero. The radiator should be flushed with clean water before the compound is introduced, and care should be taken that there are no leaks.

MARINE ENGINE.—A new marine engine of moderate power has recently been placed in the market by Fairbanks, Morse & Co., of Chicago. It is designed for installation in small boats, yachts, luggers, etc., the motor being constructed on simple lines with the fewest possible parts and these accessible under all conditions of use. The motor is a single cylinder, four-cycle vertical engine with jump spark ignition and a rating of 4 1-2-horsepower. The crankshaft is constructed of nickel steel and the bearings are unusually ample for a motor of this size. The equipment supplied is large and covers nearly everything required for a power boat except the hull. It is the intention of the company to soon place another model in the market, a two-cylinder engine to bridge the gap between the new single-cylinder and its regular 10-horsepower marine motor.

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SPECIAL NOTICES

Advertisements inserted under this heading at 20 cents per line; about 7 words make a line. Remittance should accompany copy. Replies forwarded if postage is furnished.

A FEW GOOD AGENTS wanted for Jackson cars—We have some choice unoccupied territory in New York, New Jersey, and Pennsylvania in which we would like to secure live agents to push the sale of the Jackson Touring Cars. Three models: 24 H.P., $1,250; 24 H.P., $1,500; 45 H.P., $2,500. Good proposition for agents. Write at once. Jackson Automobile Co., Lombardy St., Newark, N. J. Mar1

CADILLAC F, latest 1905 model; condition in every respect guaranteed first-class. For price write Frank H. Blodgett, Janesville, Wis. Feb15

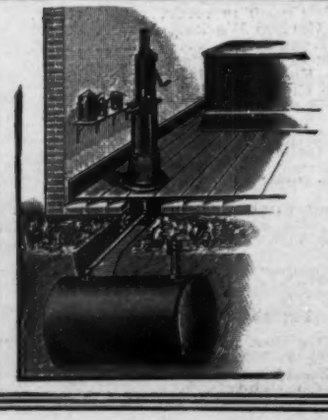
CHAUFFEUR, thorough mechanic, licensed, wishes position; willing to travel; Danish; A-1 references. Charles Adolphson, 1612 Fairmount avenue., Philadelphia, Pa. Feb15

CHAUFFEUR, Italian, experienced, good reference, and license, desires position with private family going to Milan Exposition, or anywhere. V. Montalbino, 73 Lakeside Ave., West Orange, N. J. Feb8

DRAUGHTSMAN, technical graduate, thoroughly familiar with the automobile line, can take charge of the entire design and construction, wants situation; good reference. A. L. P., care The Automobile. Feb8

FOR SALE—1906 Model K Winton, run one week. W. P. Hulbert, 216 E. 3d St., Cincinnati, O. Feb8

FOR SALE—15-tube radiator, $10; 24-tube, $15. A. M. Symonds, 901 No. Fairfield Ave., Chicago Ill. t.f.



THE NATIONAL GASOLINE TANKS

¶The National Long Distance Gasoline Storage Outfit, which permits of placing the supply tank under ground, the pump being inside the building. In perfecting this outfit we have observed to the letter the rules of the underwriters' Laboratories, and can recommend it to be the safest and most economical way of handling gasoline ever devised ¶This pump is one of our latest, Double Cylinder, which in operating there is no lost motion, every movement of the handle pumps and measures oil, saving time, labor and money. ¶This outfit is especially designed for Automobile Garages. ¶Ask for Catalogue.

THE NATIONAL TANK CO., Inc., DAYTON, OHIO